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A COMPRESSION EXTRACTION METHOD FOR EXTRACTING TEXTILE MATERIALS

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INTRODUCTION

RAPID, as well as accurate, methods for determining oil and grease contents of textile materials have been the goal of many investigators. The American Chemical Paint or McKenzie method (*1*) has been used during the past ten years for analyzing residual grease content of scoured wools. However, for analyzing yarn and oiled stock, soxhlet extraction procedures generally have been followed. The present paper deals with a special apparatus and procedure patterned after Dickinson and Palmer's technique, (*2*) which circumvents the shortcomings of both the McKenzie and soxhlet methods. The "Compression Extraction" method, developed at the Forstmann Woolen Company, is herein discussed on the basis of results derived from woolen yarn and oiled stock samples. The accuracy and reproducibility of the results were judged by comparing the new method with the established soxhlet extraction procedures using ethyl ether.

DESCRIPTION OF APPARATUS

The complete "Compression Extraction" apparatus is shown in Figure 1, a single unit being illustrated in Figure 2.

The plunger and extraction tube are made of brass while the remaining parts are machined from steel.

The main purpose of the assembly is to maintain a uniform pressure on the samples when the solvent is allowed to flow through the samples. This is accomplished through the use of a lever arm by which a load can be distributed equally to each of the plungers, the pressure being determined by the weight on the lever arm and diameter of the piston. The lever is held in the up position by means of a ratchet type clamp when loading and removing the tubes.

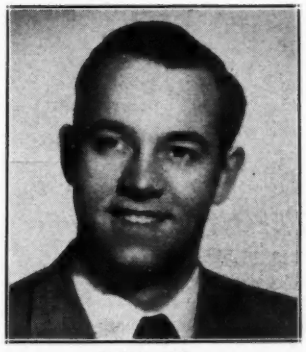
Ordinary tin or aluminum weighing dishes (dimensions given in Figure 2) can be used in conjuction with a forced draft drying oven (greasometer type) to provide rapid and complete drying of the extract. The only other necessary equipment needed is an analytical balance.

PROCEDURE

In order to take full advantage of the speed with which extracts can be determined by this method, it is recommended that groups of 10-gram samples be weighed and extracted in multiples of three. A "pulp" balance or a small torsion balance is ideal for this purpose.

The weighed samples are inserted into the removable extraction tubes and tamped down manually with a separate brass rod. The tubes are returned to their respective slots, and with the release of the ratchet type clamp, the plungers enter into each tube. Good contact is insured between the sample and piston before the operating load of 5 kilos to the system or a pressure of 13 psi is applied on each piston.

Fifty milliliters of carbon tetrachloride are measured in graduates for each sample. The solvent is poured into the beveled tops of the extraction tubes as rapidly as the porosity of the wool permits and is allowed to flow freely through the compressed wool plugs. Tared tin containers



R S Rankl

are positioned below each extraction tube ready to receive the flow of solvent and dissolved extract. After dripping ceases (in about 3 minutes) the pressure is released as the lever arm is brought to the up position.

Loose wool samples will continue to drip for a short time after pressure is released, whereas yarn samples will stop finally when the pressure is released. It is apparent then that three similar samples must be extracted together for economy of running time as well as consistency of applied pressure.

A forced-draft drying oven is utilized to evaporate the solvent from the tin containers. After evaporation (in about 20 minutes) and cooling are complete, the amount of extract removed can be determined by reweighing the container plus extract and subtracting the tare of the container. The equivalent soxhlet extraction value can then be found by referring to Figure 3.

CONTROLLING OF VARIABLES

Upon investigation of Dickinson and Palmer's rapid method of determining ether extracts (*2*), its practical application for control testing was envisioned. A similar apparatus was used for preliminary

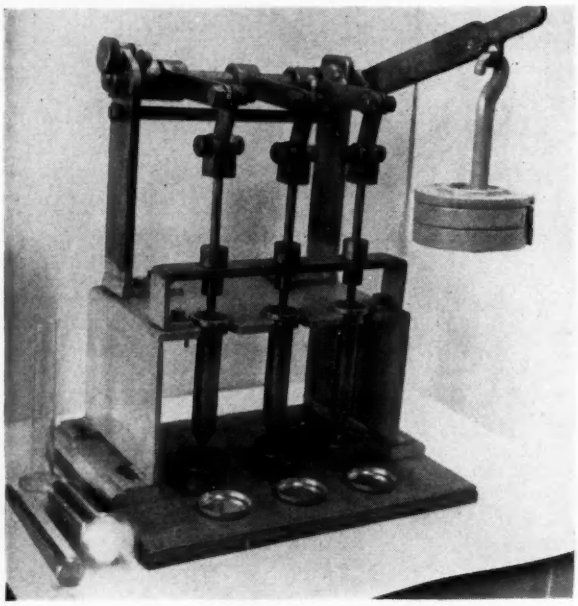


Figure 1
Compression Extraction on Apparatus

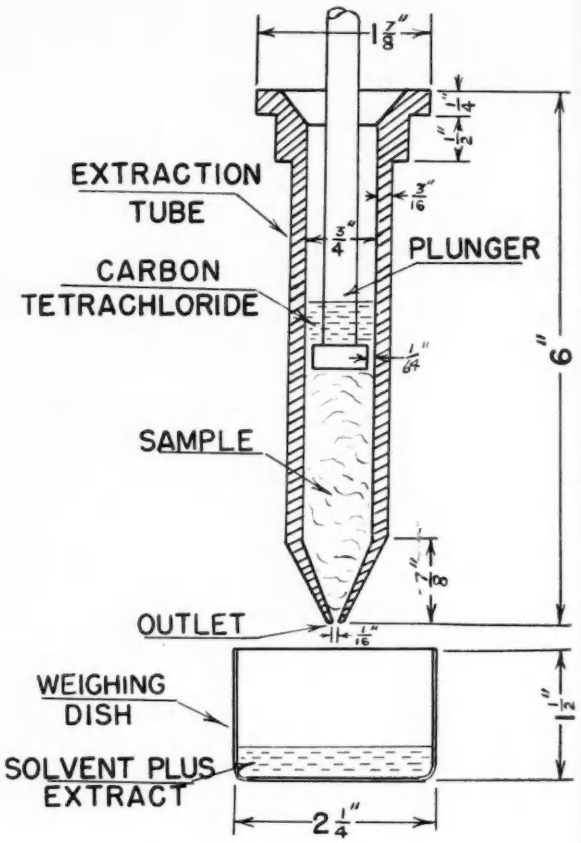


Figure 2
Compression Extraction Unit

testing with ethyl ether. Results obtained by this method led to further investigation on a more practical basis. A single brass extraction tube, similar in appearance to an ordinary grease gun, with a threaded plunger assembly for applying pressure by screwing the piston down on the wool sample, was used. The solvent, carbon tetrachloride, was added by means of a pipette through a small hole on the top cap of the tube.

Trial runs were made with this apparatus to determine what pressure and volume of solvent would be most convenient with respect to time required for the solvent to run through a five-gram sample. Following the selection of the desired pressure setting and volume (25 ml), numerous tests were conducted using this rapid method and corresponding tests using the regular ether soxhlet method. The results of the compression extraction with carbon tetrachloride were plotted against the ethyl ether soxhlet extraction values. (See Fig 3.) The resulting graph may be used to translate the compression values of any unknown sample into ether soxhlet extraction values, using the following correction values:

Compression Extraction Value	*Correction Value*
%	
0.5	0.25
1.0	0.25
2.0	0.25
4.0	0.30
6.0	0.35
8.0	0.40
9.0	0.40

The single compression tube with the threaded plunger rod, however, was found to be impractical and difficulty in adding solvent to the tube was encountered. A modified apparatus was then constructed, as illustrated in Figure 1, with a lever mechanism for applying the pressure to the sample. The tubes were constructed with a conical shaped top for adding the solvent. Test results given in this paper are based on the use of the modified apparatus.

Since the comparative soxhlet extractions were made on 10-gram samples, it was decided that similar samples would also be used for the new method in order to minimize variations. The volume of solvent was proportionately increased to 50 ml.

For the original trials conducted on the compression extraction unit, similar samples, varying only amount and manner of applying the pressure, were run in the same manner.

Upon standardization of these variables (solvent, sample weight, volume of solvent and pressure) numerous trials were run to determine the reliability and errors of this new method of extraction.

COMPARISONS BETWEEN THE COMPRESSION METHOD AND SOXHLET EXTRACTION

Based on the procedure outlined above, comparative tests were made on some typical materials available for analysis in a woolen mill. These samples included the following:

(A) oiled stock
(B) woolen yarn
(C) dry combed top
(D) raw wool

Results listed in Tables I, II, III and IV all include the compression extraction value adjusted with correction factors, with the exception of those in Table IV. The samples listed in Table I were oiled with emulsified vegetable oil; the same type of oil was also present in the yarn samples. The top samples were of combed soap-soda scoured wools. The grease wool samples were one-half inch core borings from bales of fine-grade Australian wools.

The results in Table I are based on determinations made on random, duplicate subsamples drawn from a 200-gram carded sample from an oiled lot. The original samples for ether extraction and

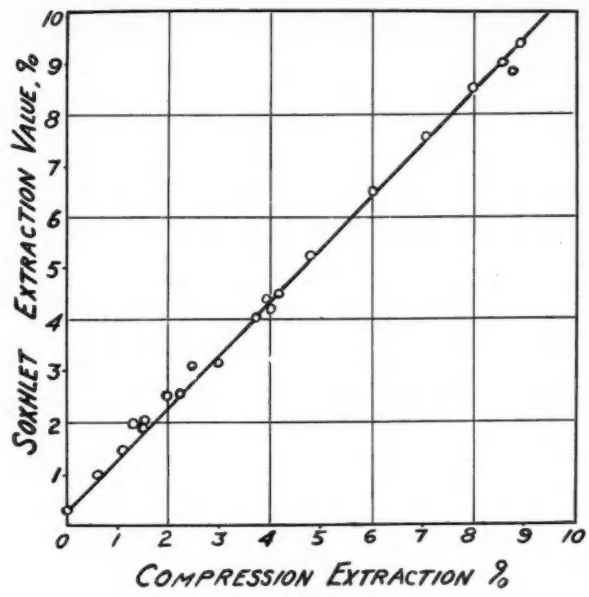


Figure 3
Compression Extraction vs Soxhlet Ether Extraction

carbon tetrachloride compression extraction weighed 10 grams. The soxhlet extraction involved 20 repeated siphonings with ethyl ether. The average values for these samples as derived from the data in Table I are as follows:

Ether Soxhlet Mean Value: 5.70%, *Standard Deviation*, 0.56%.

Compression Extraction Mean Value: 5.64%, *Standard Deviation*, 0.72%.

Duplicate determinations by the compression technique gave an average difference of 0.81% as compared with 0.63% by the ethyl ether method. The ether method, therefore, exhibited a slightly greater precision but not enough in view of the longer and more complex procedure. Comparing the average of the methods in the last column of Table I, the resulting differences show close agreement between the methods. Their difference averaged 0.27% and only in two out of 14 cases did they exceed 0.50%. Tests of significance showed that the mean values were not significantly different under the trial conditions. At least 10 determinations per method would be necessary to have made a difference of 0.80% significant.

A series of tests were made on samples of woolen yarns using the rapid compression method and soxhlet extraction with ether (Table II). The average differences between methods were 0.08% and exceeded 0.10% in only one case in six. The difference between duplicate determinations by the compression technique was 0.18% compared to 0.14% by soxhlet extraction. Because of a superior blending of fibers, variation within yarn samples has been reduced enormously over sample variation in carded oiled stock. Only in sample #5 did the difference between duplicates (over 0.60%), become significant. The average values for this part of the study showed the following close agreement between the methods:

Ether Soxhlet Mean Value: 6.59%, *Standard Deviation*, 0.08%.

Compression Extraction Mean Value: 6.62%, *Standard Deviation*, 0.11%.

Extraction of the dry combed top, with lower residual grease contents, shows the greatest deviation between methods (Table III). The compression method produced values approximately intermediate between the ether soxhlet and ACP carbon tetrachloride extractions. The compression values are in closer agreement with the ether values, since they have been adjusted to give an "ether extractable." All three methods appear to be adequate for mill control of small residual extractables in scoured wool or top. The compression method value was significantly different from the ACP extraction in the case of top sample. In only one instance did the compression average differ by as much as 0.10% from the soxhlet ether extraction value (Sample 2).

The compression extraction method may be applied for determining the total grease content in raw wools (Table IV). A comparison was made on samples obtained by coring Australian baled wool with ½ inch Wollner coring apparatus. A series

TABLE I
COMPARATIVE VALUES ON OILED STOCK
PERCENT EXTRACTABLE

Sample	Ether Soxhlet extraction				Compression extraction				Difference between averages
	A	B	Diff A-B	Avg	A	B	Diff A-B	Avg	
1	6.25	7.48	1.23	6.89	5.82	8.50	2.68	7.16	0.27
2	6.54	5.65	0.89	6.10	5.51	6.88	1.37	6.20	0.10
3	4.28	4.22	0.06	4.25	3.86	3.85	0.05	3.86	0.39
4	4.02	4.47	0.45	4.24	4.32	3.36	0.96	3.84	0.40
5	5.46	4.91	0.55	5.18	5.43	4.90	0.53	5.16	0.02
6	5.40	5.27	0.13	5.34	6.00	5.17	0.83	5.58	0.24
7	8.38	7.10	1.28	7.74	7.70	7.63	0.07	7.66	0.08
8	3.88	4.96	1.08	4.42	4.21	5.32	1.11	4.76	0.34
9	4.72	5.42	0.70	5.07	4.38	5.42	1.04	4.90	0.17
10	5.48	6.00	0.52	5.74	5.24	5.39	0.15	5.32	0.42
11	5.85	5.88	0.03	5.86	6.52	6.23	0.29	6.38	0.52
12	9.94	8.93	1.01	9.44	10.15	8.65	1.50	9.40	0.04
13	5.45	5.05	0.40	5.25	4.64	4.50	0.14	4.51	0.72
14	4.03	4.54	0.51	4.28	3.88	4.54	0.66	4.21	0.07
Average	5.19	5.71	0.63	5.70	5.55	5.74	0.81	5.64	0.27
Standard Deviation for methods				0.558				0.718	
Standard Deviation for all determinations								0.484	

TABLE II
COMPARATIVE VALUES ON WOOLEN YARNS
PERCENT EXTRACTABLE

Sample	Ether Soxhlet extraction				Compression extraction				Difference between averages
	A	B	Diff A-B	Avg	A	B	Diff A-B	Avg	
1	4.75	4.67	0.08	4.71	4.63	4.69	0.06	4.66	0.05
2	5.42	5.37	0.05	5.40	5.55	5.39	0.16	5.47	0.07
3	8.41	8.42	0.01	8.42	8.51	8.49	0.02	8.50	0.08
4	4.42	5.03	0.61	4.72	5.21	4.53	0.68	4.87	0.15
5	7.97	7.96	0.01	7.96	8.00	7.95	0.05	7.98	0.02
6	8.32	8.38	0.06	8.35	8.22	8.31	0.05	8.26	0.09
Average			0.14	6.59			0.18	6.62	0.08
Standard Deviation for methods			0.08				0.11		
Standard Deviation for all determinations							0.106		

TABLE III

COMPARATIVE EXTRACTABLES ON DRY COMBED TOP
PERCENT EXTRACTABLE

Top sample number	Ether Soxhlet extraction	A C P carbon tetrachloride method	Compression extraction			Difference between compression and A C P	Difference between compression and Soxhlet
			A	B	Avg		
1	0.47	0.46	0.51	0.51	0.51	0.05	0.04
2	0.28	0.37	0.38	0.39	0.38	0.01	0.10
3	0.67	0.80	0.67	0.73	0.70	0.10	0.03
4	0.49	0.30	0.41	0.40	0.40	0.10	0.09
5	0.80	0.61	0.78	0.74	0.76	0.15	0.04
6	0.83	0.64	0.75	0.74	0.74	0.10	0.09
7	0.85	0.77	0.83	0.76	0.80	0.03	0.05
8	0.37	0.35	0.38	0.39	0.38	0.03	0.01
Average	0.60	0.54			0.58	0.07	0.06
Standard Deviation					0.027		

TABLE IV

GREASE CONTENT OF WOOLS
PERCENT EXTRACTABLE

Aust Wool No. 1, cc* 65.7%	Determinations						Avg	Standard Deviation
	1	2	3	4	5	6		
Soxhlet	16.32	15.03	14.72	15.78	14.26	14.68	15.13	1.76
Compression	15.11	15.87	15.37	16.48	14.94	14.55	15.40	1.55
Difference between methods							0.27	
Aust Wool No. 2, cc* 67.8%								
Soxhlet	18.41	16.81	18.09	17.57	17.10	15.57	17.26	2.15
Compression	17.18	17.74	17.93	19.74	16.09	16.94	17.60	2.63
Difference between methods							0.34	
Aust Wool No. 3, cc* 63.9%								
Soxhlet	14.69	15.03	14.75	14.88	15.15	14.69	14.86	0.43
Compression	14.37	14.71	14.21	16.25	15.46	15.07	15.01	1.65
Difference between methods							0.15	
Average difference between methods							0.25	

* Clean Content

of 10-gram samples were extracted by ether using the soxhlet apparatus and the second series, by the compression technique. A small piece of glass fiber was placed in the compression tube to filter out the fine dirt present in the grease wool. Since these amounts of extractables are larger than those normally handled in compression equipment, no adjustments were applied. With 6 determinations each, the averages differed by less than 0.4%. The soxhlet extraction showed only slightly more precision, with an average standard deviation of 1.44 as compared to 1.94 for the compression method. Therefore, the compression technique should be adequate for routine evaluation of grease level in raw wool.

ACKNOWLEDGMENTS

To make the instrument a workable and practical laboratory apparatus for handling numerous samples, the investigators are particularly indebted to Herbert C Haller, Assistant Director of Research, for his helpful suggestions in perfecting its design, and Emil Stumpp, Head of Forstmann Woolen Company's machine shop, for the construction of the instrument. A number of laboratory workers assisted in the testing, in particular John Bacha, now a student at Newark College of Engineering.

BIBLIOGRAPHY

(1) McKenzie, F H — United States Patent 2,192,614 (1940).

(2) Dickinson, J C and Palmer, R C, "A Rapid Method of Determining Ether Extracts," *J Textile Inst*, 42, T6-T14, No. 1, January, (1951).

• PATENT DIGEST •

PAUL WENGRAF

SHRINKPROOFING WOOL—— Permonosulfuric Acid or Alkali Salts Thereof A, 2, 04

Brit P 692,258
(Stevensons [Dyers] Limited—June 3, 1953)

The preamble to this specification states that permonosulfuric acid (among other oxidizing agents) will impart a certain shrink resistance to wool fibers. No method has been found, however, that will help offset fiber damage when this shrinkage-controlling agent is used.

It has been found that wool can be shrinkproofed with permonosulfuric acid without damage by applying the acid or its alkaline salts in baths having a pH less than 2 or over 7. With acid treatments the solution has to contain at least 10% of sulfuric acid.

Low temperatures and concentrations require a longer treatment and vice versa. Temperatures up to 50° C may be used. The solutions are stable, permitting easy control in this process.

Example of acid treatment: an all-wool fabric is treated for 40 seconds at 33° C in a bath of 4 p permonosulfuric acid, 280 p water and 120 p sulfuric acid, then rinsed well. pH: less than 0.5.

Example of an alkali permonosulfate treatment: an all-wool fabric is treated for 30 minutes in a cold solution of 3% of permonosulfuric acid in water brought to a pH of 10 with sodium hydroxide. The fabric shows good shrink resistance in standard milling tests and the hand and color are similar to those of the initial material.

Klenk, in *Melliand Textilberichte 25*, 351 (1944), discusses the properties of persulfuric acid as an oxidant in textile applications. While good results in bleaching wool are reported, no shrink-resistant effect is mentioned.

(Other Patents on Page 639)

Proceedings of the

American Association of Textile Chemists and Colorists

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Editor of Proceedings: Carl Z Draves, 30 Lahey St, New Hyde Park, N Y

SEPTEMBER 14, 1953

EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the Secretary.

53-19

Education: one year of college.

Experience: laboratory technician and overseer of yarn dyeing.

Age: 26; married; references; position as overseer of dyeing desired, on east coast, preferably south. 8-31, 9-14

53-20

Education: school, England.

Experience: Head Dyer, USA.

Age: 55; married; references; position as wool or worsted dyer desired, California preferred but not essential. 9-14; 9-28

53-21

Education: BS, textile chemistry.

Experience: chemist, cotton finishing.

Age: 27; veteran; references; position as chemist in textile printing sales service laboratory desired, preferably in southeastern US. 9-14; 9-28

Henschel to Discuss Flammability Testing in Plant Control at Next WNE Section Meeting

AT the next meeting of the Western New England Section meeting, to be held October 2 at Rapp's Restaurant, Shelton, Connecticut, A N Henschel will discuss flammability testing in plant control.

With the recent enactment into law of a commercial standard on specific burning rates for consumer textiles which will become effective on June 3, Mr Henschel, chief chemist at Princeton Knitting Mills, Watertown, Conn, will attempt to enlarge the scope of the use of the unit proposed by AATCC.

CALENDAR

AATCC

COUNCIL
1953—Sept 17, Nov 20.
1954—Jan 27, Apr 30, June 15, Sept 15, Nov 19.
1955—Jan 21, Apr 15, June 17

NATIONAL CONVENTIONS
September 17-19, 1953 (Hotel Conrad Hilton, Chicago); Sept 15-18, 1954 (Atlanta Biltmore, Atlanta, Ga); Sept 21-23, 1955 (Chalfonte-Haddon Hall, Atlantic City, N J).

NEW YORK SECTION
Sept 25, Oct 23, Nov 20 (Swiss Chalet); Jan 29, Feb 26 (Hotel Statler, N Y); April 23, 1954, May 21, 1954 (Swiss Chalet).

MID-WEST SECTION
November 7, February 13 (Hotel Bismarck, Chicago, Ill.)

NORTHERN NEW ENGLAND SECTION
Nov 6 (LTI); Dec 4 (MIT Faculty House).

PACIFIC SOUTHWEST SECTION
Nov 20, Jan 29.

PIEDMONT SECTION
Jan 30 (Hotel Poinsette, Greenville, S C); Apr 10 (Hotel Roanoke, Roanoke, Va); June 11-12 (Outing, Mayview Manor, Blowing Rock, N C); Sept 11 (Hotel Barringer, Charlotte, N C).

PHILADELPHIA SECTION
Oct 23 (Penn-Sheraton Hotel, Philadelphia, Pa); Dec 4; Jan 15, 1954.

RHODE ISLAND SECTION
Oct 23 (Prov Eng Soc); Dec 4 (Annual Meeting, Sheraton-Biltmore, Providence).

SOUTH CENTRAL SECTION
Dec 5 (Patten Hotel).

WESTERN NEW ENGLAND SECTION
Oct 2, Nov 6 and Dec 11 (Rapp's Restaurant, Shelton, Conn).

OTHER EVENTS

AMERICAN ASSOCIATION OF TEXTILE TECHNOLOGY, INC
Oct 7, Nov 4, Dec 2 (Builder's Club, New York, N Y).

AMERICAN CHEMICAL SOCIETY
National Chemical Exposition—Oct 12-15, 1954, Chicago, Ill.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS
Textile Industry Conference—Oct 29-30, N C State College, Raleigh, N C.

AMERICAN OIL CHEMISTS' SOCIETY
27th Fall Meeting, November 2-4, Sherman Hotel, Chicago, Ill.

AMERICAN SOCIETY FOR QUALITY CONTROL
Meetings of the Carolinas Section—Oct 9, Feb 4-6, N C State College School of Textiles, Raleigh, N C.
Conference of the Carolinas, Georgia, Tennessee, Birmingham and Huntsville Sections—Nov 5-7, Chattanooga, Tenn.

AMERICAN SOCIETY FOR TESTING MATERIALS
1953 Fall Meeting, Oct 14-16, New York, N Y.

AMERICAN TEXTILE MACHINERY ASSOCIATION
Exhibit of American Textile Machinery, April 26-May 1, Atlantic City Exhibition Hall, Atlantic City, N J.

ASSOCIATION OF CONSULTING CHEMISTS AND CHEMICAL ENGINEERS, INC
Annual Meeting—25th Anniversary-October 27 (Hotel Belmont Plaza, New York).

DRYSALTERS CLUB OF NEW ENGLAND
Oct 30, Jan 18, April 30 (Hotel Vendome, Boston); June 25 (Annual Outing, Andover Country Club).

EXPOSITION OF CHEMICAL INDUSTRIES
Nov 30-Dec 5, Commercial Museum and Convention Hall, Philadelphia, Pa.

THE FIBER SOCIETY
Spring Meeting—May 5-6, Monticello Hotel and Thomas Jefferson Inn, Charlottesville, Va.

GARMENT DYERS GUILD OF AMERICA
Technical and business meeting—Dec 5, Netherlands Plaza, Cincinnati, O.

NATIONAL COTTON COUNCIL OF AMERICA
Annual Meeting—Feb 1-2, Atlanta, Ga.
Cotton Research Clinic—Feb 25-27, The Carolina, Pinehurst, N C.

NATIONAL SAFETY CONGRESS AND EXPOSITION
Oct 19-23, Conrad Hilton, Morrison and Hamilton Hotels, Chicago, Ill.

NEW YORK BOARD OF TRADE (DCAT)
Drug, Chemical and Allied Trades Section; 63rd Annual Meeting, Sept 24-27, Pocono Manor Inn, Pocono Manor, Pa; 28th Annual Dinner, March 4 (Waldorf-Astoria, New York, N Y).

PHI PSI FRATERNITY
51st Annual Convention, Feb 25-27 (The Carolina, Pinehurst, N C).

SCREEN PROCESS PRINTING ASSOCIATION
Screen Process Exhibition under the auspices of the New Jersey Chapter—Sept 14-Oct 3, Newark Public Library.

SOCIETY OF CHEMICAL INDUSTRY
Plastics and Polymers Group Meeting—March 24-26, Institution of Electrical Engineers, Savoy Place, London, England.

SOCIETY OF INDUSTRIAL PACKAGING AND MATERIALS HANDLING ENGINEERS
October 19-24, Mechanics Hall, Boston, Mass.

SOCIETY OF THE PLASTICS INDUSTRY
Meeting of the Sheeting and Coated Fabrics Division—Dec 3-4, Commodore Hotel, New York, N Y.

SOUTHERN TEXTILE EXPOSITION
October 4-9, 1954 (Textile Hall, Greenville, S C).

TEXTILE RESEARCH INSTITUTE
1953 Annual Meeting, Nov 12-13, Commodore Hotel, New York.

TEXTILE TECHNICAL FEDERATION OF CANADA
Exhibit—April, 1955, Show Mart, Montreal.

*Research Newsletter No. 4

NEWS IN GENERAL

The new pamphlet, "AATCC Research In Action," which has been several months in the making, was initially mailed on September 3 to Corporate Members and to members of the Council, Executive Committee On Research, Technical Committee On Research, and all sectional corporate membership committees. The chairmen of all research committees also received copies. Another mailing to some 1500 prospective corporate members is being readied for release in October.

For the benefit of individual members of AATCC, the pamphlet will be reproduced in its entirety in a forthcoming issue of the American Dyestuff Reporter. It tells for the first time in simple, compact form the story of AATCC Research. It was produced to meet the need of corporate membership committee workers in their membership extension activities as well as for general publicity purposes both within and ouside the organization.

Another publication being readied for early release is entitled "Rules for Organization and Function of AATCC Research Committees". This is a carefully drawn outline of the functions and duties of research committees and personnel prepared by TCR Chairman Charles Dorn and Research Director Harold W Stiegler. The new Rules will be mailed to all committee chairmen and secretaries as well as other executive personnel of AATCC Research at an early date.

AT RESEARCH HEADQUARTERS

A new test is being sought in work recently undertaken in co-operation with the Washfastness Committee concerning the effect of alternate light exposure and laundering. The study will determine the Fade-Ometer equivalent to direct sunlight exposure on a number of dyed and printed fabrics when the light exposure is followed by washing.

Staff associate H E Glidden has found that accelerated alternate wash and wear tests are possible in the Accelerotor by merely inserting in the instrument a metal-ribbed liner for wash tests or an abrasive liner for dry wear tests. The time, in minutes, depends on the severity desired.

The effect of moisture content on the performance of durable-type repellent finishes after drycleanings is being investigated for the special committee on FTC water-repellency tests. The time it takes to reach equilibrium conditions at various relative humidities is being studied as well as the effect of various steam pressing conditions.

COMMITTEE ACTIVITIES

William A Holst, Jr of Allied Chemical & Dye is forming a committee to review the test on Stoving.

The committee on bleaching will study problems relating to the pH of finished cloth. T E Bell of Du Pont's Electrochemicals Dept is chairman. The commitee will undertake the development of (1) a test to determine the pH of finished cloth and (2) a method for evaluating colorfastness to chlorine.

Ralph Smith of the New Jersey Laundry and Cleaning Institute has been appointed Chairman of a newly organized Committee on Absorption.

Arthur C Merrill, Jr, Director of the Sales Service Laboratory of Arnold Hoffman & Company, has been made a member of the Research Committee on Colorfastness to Light.

George Wernz of A M Tenney Associates has been appointed Secretary of the Committee on Colorfastness of Dyed Cellulose Acetate to Atmospheric Oxides of Nitrogen.

The Quarterly meetings of the Council, Technical Committee on Research and research committees will resume this Fall on a one-day basis. This change from the two-day schedules of past meetings was made to decrease the demand on members' time.

* Published every other issue of the AMERICAN DYESTUFF REPORTER.

IMPORTANT NOTICE

To all manufacturers of Textile Chemical Specialties:

THE American Association of Textile Chemists and Colorists is now collecting material for the 1954 Edition of its *Technical Manual and Year Book,* and solicits your cooperation.

Please note that the list of Textile Chemical Specialties will be completely revised and brought up to date, as in past years. All manufacturers and importers of textile chemical specialty products are therefore invited to submit data for the 1954 Edition, covering the following items only:

New data not previously listed
Correction of errors
Deletion of obsolete products

Cards should be filled out strictly in accordance with the directions accompanying this notice, and following the style of presentation employed in the 1953 Edition. All cards should be mailed to the undersigned before December 1, 1953.

WILLIAM H CADY, *Editor*
Technical Manual and Year Book
127 Power Street
Providence 6, R I

Directions for Filling Out Cards

In the compilation of this list of American sources of textile chemical specialties, products are selected primarily for their specific usefulness in textile processing, with the idea of presenting such information for the benefit of the textile chemist and colorist. However, because some textile chemicals, such as the surface-active agents, are employed in other industries, nontextile uses are permitted to be indicated.

The reader should bear in mind that information from firms concerning uses and compositions is repeated without investigation and thus cannot be vouched for by the AATCC. On the other hand, because listings are made without charge for the benefit of our membership, it is nevertheless possible to edit all listings carefully and especially to eliminate exaggerated claims.

Information for new products should be tabulated on cards as described below. Where it is desired to make corrections in old entries in either the Index or the Alphabetical List, or to make deletions of old entries for withdrawn products from both of these, new cards should be prepared in the same manner, appropriately marked for correction or for deletion, as described in these directions. Do not prepare cards for products already properly indexed and listed. Please note that we do not furnish printed forms; ordinary white ruled 3" x 5" index cards should be used.

I. Key

(a) On first line: firm abbreviation, limited to five letters.

(b) On third line: firm name.

(c) On fourth and fifth lines: firm address.

II. Index

(a) On first line: enter one of the headings taken from the Index in previous editions, indicating an important use for the product being reported. If it has several uses, make out a separate card for each.

(b) On third line, toward left: list the name of the product (only one) without any descriptive letters or numbers.

(c) On third line, near right margin: list the abbreviation of the firm name, taken from the Key.

(d) On bottom line: indicate whether the card is a New, Corrected, or Deleted Index Entry.

III. Alphabetical List

(a) On first line: abbreviation of firm name.

(b) On third line; complete proprietary name of product, with descriptive letters or numbers; if name of product is a registered trade-mark, indicate the fact by an asterisk following the registered part of the name.

(c) On fifth line: various uses.

(d) On eighth line: chemical nature, *adequately given.*

(e) On tenth line; patent number, if product is patented.

(f) On bottom line: indicate whether the card is a New, Corrected, or Deleted List Entry.

In making out the cards as described above, it is necessary that you follow the instructions carefully; otherwise they may have to be returned for improvement. In particular, please avoid the use of capitals except for initial letters; be sure to report all products which have been discontinued; and please see that the "Chemical Nature" is properly recorded. We do not ask you to reveal secret information, but such descriptions as "amine compound" or "organic salt" are not considered adequate.

Cards containing information about textile chemical specialties for the 1954 Edition of the *Technical Manual and Year Book* must be received before December 1, 1953, to meet editorial schedules.

South Central Section——

CONTROL INSTRUMENTS AND THEIR APPLICATION IN MODERN DYEHOUSE OPERATIONS*

WALTER H RIDLEY

The Foxboro Company, Foxboro, Mass

MANY mills today are paying considerable money to outside engineering firms for advice on how they might best invest in capital expenditures for their dye house. This investment is very considerable today in comparison with just a few years ago.

Three principal reasons for this increase are these:

1) The use of all-stainless-steel dyeing machines.

2) The development and acceptance of the new synthetic fibers with the added requirement of high temperatures for dyeing.

3) The necessity of control instruments for obtaining the maximum return from the new dyeing machines.

These developments did not all come at once. Stainless steel is about 20 years old. (The machine cost in stainless steel is roughly five times that of its equivalent in wood and cast iron.)

There was no thought of the new synthetics when many of these stainless machines were built and installed. Yet, now with the advent of these new synthetics and, in some cases, with the need for high-temperature dyeing come revisions in machine design and operational procedures.

Until quite recently recording control instruments were not considered as essential. However, today it is quite different. They are very essential, as will be seen later. In many mills, each morning the dyer receives the previous day's chart records. They are reviewed carefully before going on to the files, to the superintendent, or to the engineering department, as the case may be.

Thus, the outside engineering firms are advising their clients to purchase complete integrated control systems and to train their operators, supervisors and mechanical departments in the use and maintenance of this equipment. The progressive dyeing-machinery manufacturers are making a real study of the control instruments available and recommending their use. One manufacturer, for example, has available for his customers four erection mechanics who are thoroughly trained in operation and maintenance of these instruments.

W H Ridley

The attainment of modern standards of quality in dyeing and efficiency in operation is greatly facilitated by the use of control instruments. The higher temperatures necessary in dyeing the new fibers and the use of new stainless-steel batch and continuous equipment also require automatic control for the best results. The author discusses especially time-schedule temperature control of different types and time-schedule control of liquor flow. The advantages of automatic control in general are pointed out.

REASONS FOR USE OF CONTROL INSTRUMENTS———There are definite reasons for the use of modern control methods, of which absolute necessity is perhaps the most important. It is no longer possible for man without the aid of control instruments to perform all the necessary functions to obtain proper dyeing, especially on synthetic mixtures. There is not time enough for him to make titrations, to adjust chemical feeds, to check temperatures, pressures, flows and liquor levels and to adjust them to the proper values.

The quality of his product is greatly affected unless these variables are carefully controlled. If the temperature rises too rapidly in batch dyeing, the color goes on unevenly. On vats, too much hydrosulfite will cause loss of shade from overreduction. On packages too much flow will cause uneven pickup or distortion of packaged yarn. Without pH control the acidity of the bath may be too low to fix chrome colors on wool. Conductivity control of weak acid make-up bath prevents poor dyeing from uneven treatment.

From consideration of economy of materials, control instruments are well justified. In a typical instance, redyes were reduced from 20% to 1% in package dyeing with the aid of controls. In another case, $250.00 was saved in one day from the Redox Control of hydrosulfite in vat dyeing. And in still another plant, steam and water consumption was reduced 25% with temperature and level controls.

From an operator's point of view, a dyeing procedure is a much simpler and easier job with controls, whether or not more pounds of material are produced. The job being easier, an operator does not get so tired during working hours and, as a result, does better work. When given these labor-saving tools the operator has more respect for his job.

Also, please bear in mind that the initial cost of these control instruments is far less than the machinery costs. It has risen for all industries from approximately 0.6% in the thirties to perhaps 1.2% today. Furthermore, today in textile dyeing as in the oil and chemical industries the job can no longer be competitively done without the use of control instruments.

Instruments are being used today for controlling temperatures, pressures, flows, liquid level, redox, or oxidation-reduction, pH and conductivity. These instruments either automatically or semi-automatically control valves, motors, feeders, and other devices.

For batch work, exact timing of the entire dyeing cycle is most important, and timers are built into the controllers. For continuous dyeing the control instruments are usually what we call single-action instruments and as a result are simpler mechanisms than those for batch dyeing.

TIME-SCHEDULE CONTROL OF TEMPERATURE———Because there are many more batch dyeing machines, some of their principal instruments will be discussed. There are available a whole series of time-schedule instruments for controlling the temperature of a dyebath. They are identified as follows:

* Presented at the Hotel Patten, Chattanooga, Tenn, on Feb 28, 1953.

TEMPERATURE CONTROLLERS

1) *Single-Action Controller*

Operation: Dyeing temperature is reached in the shortest possible time and then is held there until the Controller is manually shut off.

Use: This instrument is picked primarily because of low initial cost. It is not a Time-Schedule Controller and is not extensively used for this application. Its use is principally confined to very small dye houses.

2) *Elapsed-Time Controller*

Operation: An interval timer is set which immediately starts both the timer and Temperature Controller into operation. Dyeing temperature is reached in the shortest possible time and is held there until the end of the set time. The timer then automatically signals and shuts off the instrument.

Use: Again, this instrument is picked primarily because of price. It is ideal for simple dyeing applications where the user can depend on a constant "bring-up" time and add to it the time required after the dyeing temperature has been reached. The sum of these two is the total time set on the instrument.

3) *Deferred-Action Elapsed-Time Controller*

Operation: An interval timer, upon being set, puts Temperature Controller into operation. However, the starting of the timer is automatically deferred until the dyeing temperature is reached. The rest of the operation is the same as for the Elapsed-Time Controller.

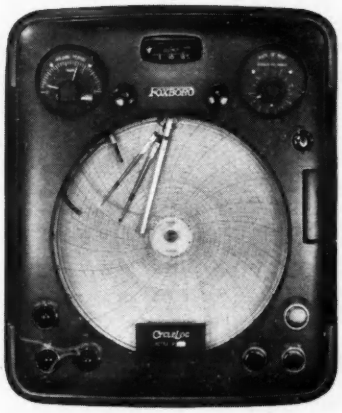
Use: This slightly more expensive unit is picked where precision is desired as to the time interval after the dyeing temperature has been reached. Because of varying steam pressures, especially in the dye house, the time interval for "bring up" may vary considerably. This condition would seriously affect the value of the Elapsed-Time Controller, but not the deferred-action instrument.

4) *Cam-Set Controller*

Operation: A cam is cut to the time-temperature schedule and mounted on a motor drive. When started, the cam follower will position the index pointer for desired temperature rise and hold periods and then will automatically shut off the instrument. Provision is also made for push-button start, automatic shut off and other variations.

Use: The choice of this instrument has two basic underlying reasons. The first is that the rate of temperature rise, or "bring up" to the dyeing temperature must be carefully controlled. The reason for this is to slow down the "rise" so as to prevent the material closest to the heating source from "grabbing" the dyestuff because of its higher temperature.

The second reason is that there is to be no basic change in the dyeing schedule. If the schedule is frequently changed, the problem of changing cams, or modification of the cam, nullifies the benefits derived. It is the preferred instrument on critical dyeing applications where



CycleLog Temperature Controller for batch-dyeing operations

the identical dyeing cycle is repeated over and over.

5) *CycleLog* Controller (Camless - Type Controller)*

Operation: The instrument has push-button start with ability to repeat cycles by simply re-pushing start button. Setting knobs provide complete control with infinite adjustability of starting and dyeing temperatures, rate-of-rise and holding time, warm-up and overtime. Signal lights follow the schedule and the instrument automatically shuts off at the end of the holding period.

Use: This compact instrument is used for critical dyeing applications, such as those which require the Cam-Set Controller, as well as for applications requiring great flexibility. It is especially designed and primarily used for textile-dyeing applications. Although somewhat more expensive, it has "built-in" complete flexibility, so that, in a moment, a complete new dyeing schedule may be set up.

The control of the "bring-up" time, and the deferring of timing interval until the dyeing temperature has been reached, are included.

Where the dyeing cycle is apt to be changed frequently, and the kettle may be used for other purposes, such as scouring and stripping, this instrument is of great value because of its extreme flexibility. When a mill is uncertain as to its future requirements, this instrument is an ideal choice because, along with its flexibility, a complete cycle can be repeated by simply pushing the "Start" button again.

FLOW CONTROL ——— On package or beam dyeing there are two satisfactory methods of automatically reversing the dye-liquor flow. One method is to have two individual timers with automatic reset continuously operate a reversing valve in the liquor line. The timers are readily adjustable from zero to twenty minutes and, if once started, will operate the valve on set frequency intervals until stopped.

The second method is to use a cam mounted on a motor drive, one rotation of which will be longer than the longest dyeing cycle. Notches are cut in this cam at the desired sequence intervals for valve reversal. The sequence is not readily adjustable except by changing cams. However, with the cam, an irregular schedule of valve reversal can be easily carried out and duplicated automatically, for example: 15 minutes outside in, 5 minutes inside out, then 7 minutes outside in and 8 inside out, etc. This is not possible with straight interval timers.

Dye-liquor flow measurement is still quite new. Because of the compactness of dye-liquor pipes and troubles developing from orifice restriction in the line, it has been difficult to measure this flow. Pressure gauges and pump-motor-load ammeters have been used as guides for a general indication of flow.

However, with the advent of the differential pressure or d/p Cell and the use of elbow pipe taps it is now possible to have an instrument record the flow accurately in gallons per minute. The small displacement of the diaphragm (0.003") in the d/p Cell for changes in flow eliminates any trouble from color contamination and cleaning.

Thus, with this new tool, maintenance of the proper flow per pound of cotton being dyed is assured. Also, in beam dyeing, danger of blowing a beam is greatly reduced.

REDOX CONTROL ——— Redox measurement of the reducing power of the dyebath for those colors which are chemically reduced has been of immense aid to the dyer, so we are told. By being able to keep the electron concentration of the reduced bath at the proper amount one can dye Orlon fibers in colors heretofore thought to be impossible. The same thing applies to vat and sulfur colors as described in the Marhen Process. Again, the Genray Process involves the use of this redox measurement, and much successful work is being done in indigo dyeing.

LOCATION OF CONTROL INSTRUMENTS ——— The applications briefly mentioned here explain and justify the extensive use of instruments for textile dyeing. However, there is one instrument problem confronting management and the dyer which has been under considerable debate in the textile industry: that is, where should these instruments and accessories be located?

For continuous dyeing it is pretty universally agreed they should be on the floor in control cabinets near the dyeing

* The Foxboro Company, trade-mark.

ranges. For batch dyeing, however, there are three choices:

1) Controls immediately beside the machine for individual control of each unit.

2) Controls, cabinet-mounted in groups of 4, 6, or 8 in the dye house for group supervision and operation.

3) Remote control in the dyehouse office in attractive floor-mounted cabinets, sometimes 200 feet away from the kettles.

From the number of installations made it is indicated that the order of preference is as listed above, with numbers one and two most popular by a considerable margin. However, each type of dyeing, whether it be package, piece, hosiery, raw-stock or top, must be studied individually.

Satisfactory controls are now available for any location, so that it remains up to management which type to select and how much capital to invest.

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New York Section———

THE APPLICATION OF DYES TO TEXTILE FIBERS AT HIGH TEMPERATURES*

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The trend in dyeing today is toward higher temperatures of application. Since the introduction of the newer hydrophobic synthetic fibers, an even greater interest in high-temperature dyeing has been created. Some of the fundamental principles of dyeing at temperatures above 212° F are discussed. The effect of high temperatures upon the stability of dyes and the tensile strength of fibers is shown. An historical review of high-temperature dyeing, including the development of modern high-temperature-dyeing equipment, is also included.

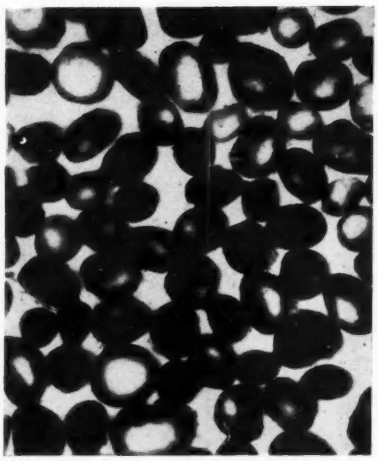

Figure 1
Cross section of wool dyed at 200°F under atmospheric pressure

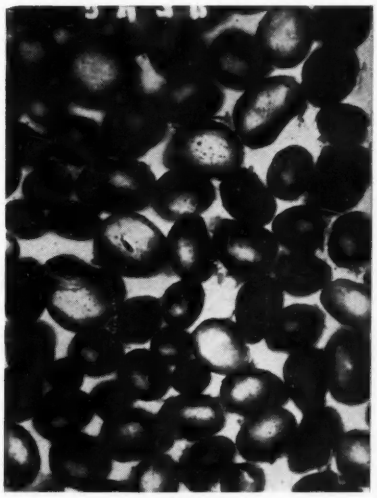

Figure 2
Cross section of wool dyed at 200°F under 50 psi pressure

INTRODUCTION

SINCE it is well known that the rates of most chemical reactions are increased by increases in temperature, it is not surprising to find that the rate of dyeing similarly increases in all cases with an increase in temperature *(24)*. In the mill, increased rates of dyeing can result in increased production and lower costs. For this reason there is a trend in the textile industry toward the use of higher and higher temperatures for dye application. This has become especially true since the introduction of the new synthetic fibers.

Strangely enough, however, it has only been in the last 15 years that a real effort has been made to dye textile fibers at temperatures above 212°. One reason for the slow progress may be due to statements such as that of Matthews *(5)*, who reported that wool is destroyed when heated in aqueous solutions at 250°F. The first research program on high-temperature dyeing was started in 1938 by the Bachmann Uxbridge Worsted Company, which was trying to develop a method for the continuous dyeing of wool under pressure *(25)*. Three years later in 1941 they were joined, at their request, by the Calco Chemical Division of the American Cyanamid Company in a co-operative fundamental study of the dyeing of wool and other fibers at high temperatures under pressure. In 1948, high-temperature dyeing was the subject of the intersectional contest paper of the Philadelphia section of the AATCC *(9)*. With the introduction of the new hard-to-dye acrylic and polyester fibers, an even greater interest has been created in high-temperature dyeing *(2, 4, 10 and 16)*.

Water normally boils at 212°F, and the application of more heat does not increase the temperature but merely increases the rate of boiling. In order to obtain higher temperatures, one must elevate the boiling point of the bath. There are two ways in which the boiling point of an aqueous dyebath can be increased. One way is to dissolve something in the bath. There are only a few substances which have sufficient solubility in water to elevate the boiling point enough to be effective. For example, a 60 per cent solution of urea has a boiling point of approximately 219°F. However, dyeings made in concentrated solutions such as these have been very poor.

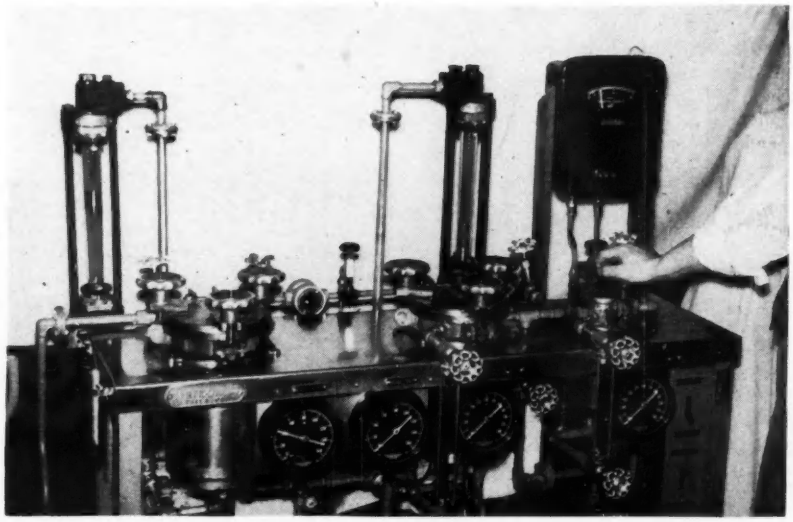

Figure 3
Laboratory high-temperature package-dyeing machine

* Presented at Fairleigh Dickinson College in Rutherford, N J, on Friday evening, April 17, 1953.

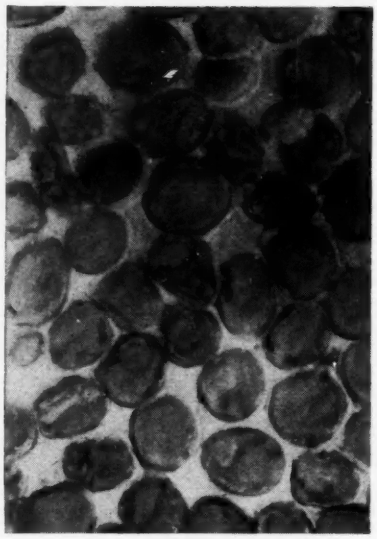

Figure 4
X-51 acrylic fiber dyed with 2% Calcosyn Blue G for 20 min at 250°F

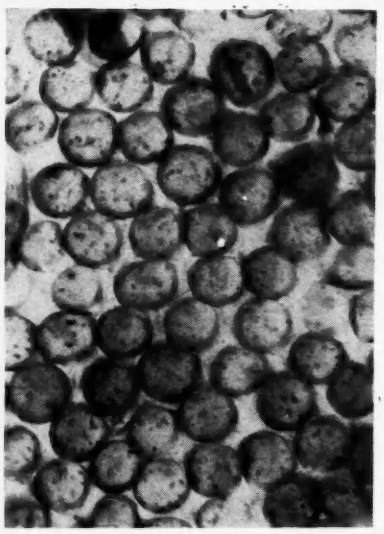

Figure 5
Dacron polyester fiber dyed with 2% Calcosyn Blue G for 20 min at 250°F

Figure 7
Orlon acrylic filament fiber dyed with 2% Calcosyn Blue G for 20 min at 250°F

Another way to elevate the boiling point, and thus make it possible to heat solutions to higher temperatures, is to increase the pressure. This seems to be the most practical method of obtaining high temperatures.

EXPERIMENTAL

EFFECT OF PRESSURE ALONE——— In order to show whether pressure has any effect upon dyeing other than permitting high temperatures to be attained, several experiments were made. In one of these, two dyeings were made exactly alike in every way except that one was made at atmospheric pressure and the other was made under a pressure of 50 lb per sq in. In both cases the dyeing temperature was 200°F. The color values obtained from these dyeings were the same. The penetration and fiber levelness were equivalent also, as can be seen in Figures 1 and 2, which show cross sections of the dyeings.

EARLY EXPERIMENTS IN HIGH DYEING———The first problem was to develop equipment for studying the dyeing of textile fibers at elevated temperatures. The initial experiments were made in an ordinary pressure cooker by R D Robinson at Uxbridge *(15)*. Because of the fact that the wool cloth had to be in contact with the dye solution during both the heating-up and cooling-down stages of the process, there was considerable decomposition of fiber and dye in many experiments. These experiments indicated, however, that some of these difficulties might be overcome by shorter times of exposure to the high temperatures.

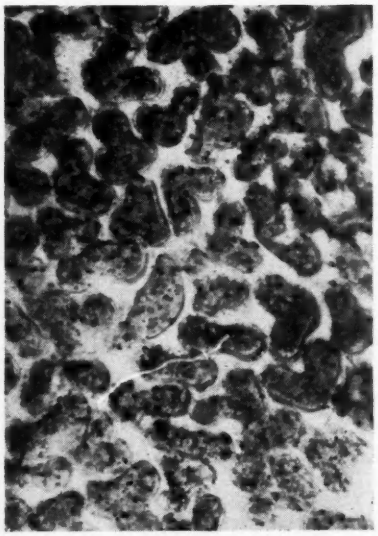

Figure 6
Orlon acrylic staple fiber dyed with 2% Calcosyn Blue G for 20 min at 250°F

FIRST LAB MACHINE———In order to accomplish this, a piece of stainless-steel equipment was designed and built at Uxbridge consisting of a dye tank and two long columns filled with mercury, which acted as pressure seals. A piece of cloth, four inches wide, could be dyed continuously by passing through one mercury column, through the heated dyebath, which was under pressure, and then out through the other mercury column. In this apparatus temperatures up to 270°F and immersion times as low as 15 seconds were used. Experiments in this equipment showed that wool could be dyed satisfactorily at elevated temperatures, provided the time of immersion was short.

SECOND LAB MACHINE———After a study of many of the fundamentals of high-temperature dyeing with the mercury-seal machine, a larger machine was built which would accommodate 36-inch-wide fabric so that some idea of the levelness of dyeing could be ascertained. A batch process was decided upon, since mercury seals were not found to be practical and mechanical methods of sealing were still being developed. A large pressure chamber was constructed with a door on one end through which a dye tank on wheels could be inserted. The cloth to be dyed was placed on a roll at one end of the dye tank and sewed to a leader previously threaded through the machine to the wind-up roll. The tank was filled with a dye solution and pulled into the pressure chamber, where the steam lines and driving mechanism were attached. The door was closed and the desired pressure was applied with compressed air. When the dyebath reached the desired temperature, the cloth was pulled through by the leader and rolled up at the other end. The time of immersion was controlled by the speed of the driving mechanism, and the temperature and pressure were held constant by automatic controls. After the dyeing, the bath was cooled, the pressure was released and the cloth was removed for rinsing and finishing.

The over-all results from this equipment were so encouraging that a machine to run continuously and to accommodate 62-inch fabric was then contemplated. However, from the beginning of the high-tempera-

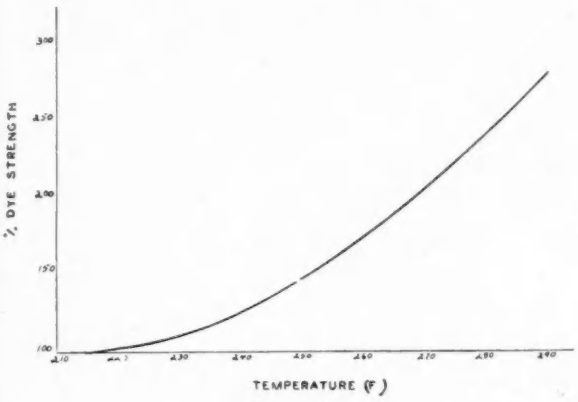

Figure 8

Dye strength measured by percent reflectance of wool dyed in a 3% solution of Calcocid Wool Blue B Conc for 50 sec at 50 lb pressure

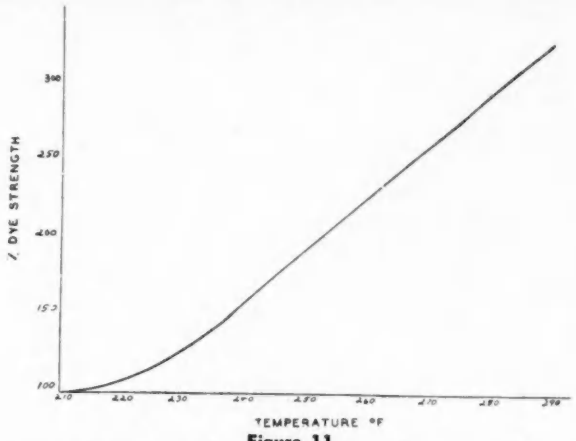

Figure 11

Dye strength measured by percent reflectance of nylon dyed in a 1% solution of Calcocid Alizarine Blue SKY for 50 sec at 50 lb pressure

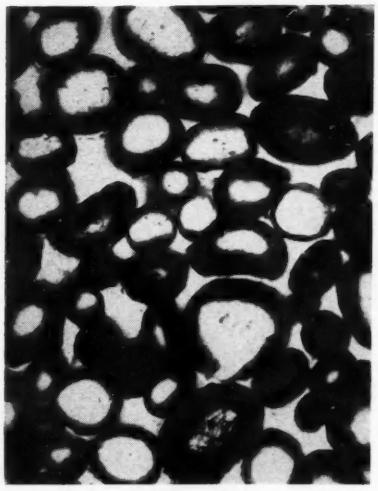

Figure 9
Cross section of wool dyed at 210°F

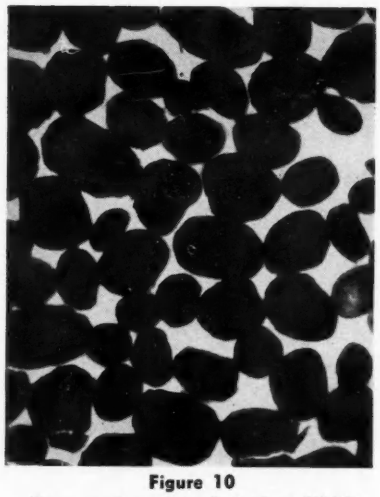

Figure 10
Cross section of wool dyed at 290°F

ture dyeing program it had been observed that, when dye solutions were held at elevated temperatures over periods of several hours, some dyes decomposed. Because of this thermal decomposition of some dyes, and other dyeing problems, the Calco Chemical Division of the American Cyanamid Company was asked by the Bachmann Uxbridge Worsted Corporation in 1941 to co-operate in a study of the dyeing of textile materials at elevated temperatures.

FIRST CALCO LAB MACHINE——— A laboratory noncontinuous dyeing unit was designed and built at Calco for dyeing at temperatures up to 300°F under an air pressure of 50 lb per square inch. This unit is constructed so that a sample can be entered into a high-temperature bath without preheating or steaming and, after the desired dyeing interval, can be removed from the bath quickly and cooled. With this machine it is possible to dye cloth in a bath at an elevated temperature for very short immersion times to simulate a continuous operation. Some of the fundamental studies on high-temperature dyeing made in this laboratory machine have been described in a recent publication *(18)*.

CALCO CONTINUOUS HIGH-TEMPERATURE LAB MODEL———In order to apply the results obtained in this preliminary investigation to continuous dyeing, a laboratory continuous high-temperature dyeing machine was also built. This machine consisted of a pressure chamber containing three individual baths that could be used interchangeably for dyeing or rinsing. The top and side of the machine were made of glass so that the cloth could be seen during the dyeing. A set of Uxbridge pressure sealing rolls was installed at both the entering and exit ends

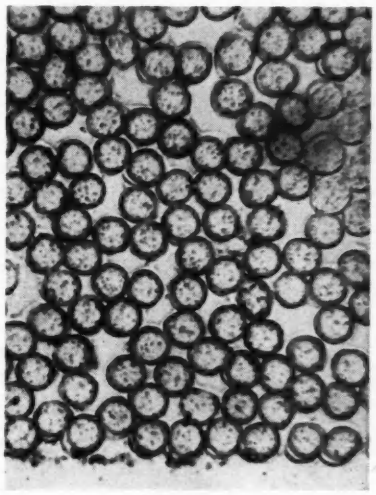

Figure 12
Cross section of nylon dyed at 210°F

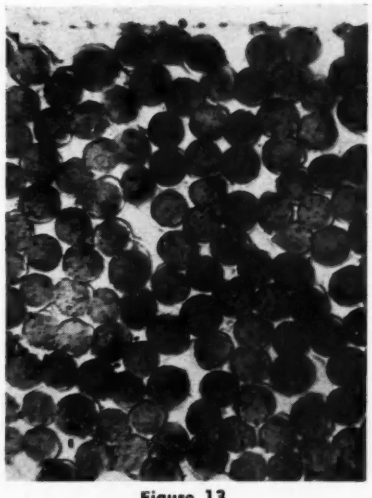

Figure 13
Cross section of nylon dyed at 290°F

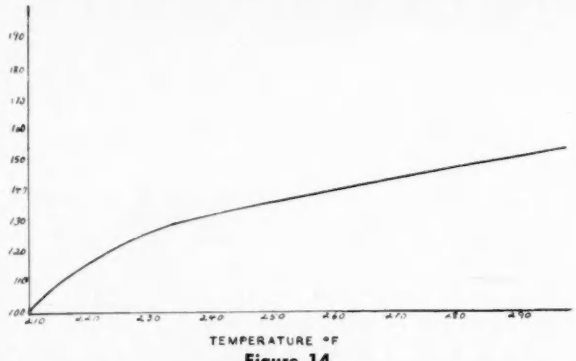

Figure 14
Dye strength measured by percent reflectance of cotton dyed in a 3% solution of Calcodur Blue 4GL for 50 sec at 50 lb pressure

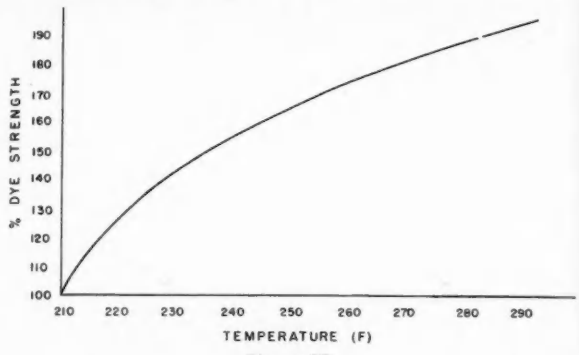

Figure 17
Dye strength measured by percent reflectance of rayon dyed in a 3% solution of Calcodur Blue 4GL for 50 sec at 50 lb pressure

of the machine. Cloth up to three inches wide could be dyed continuously at temperatures up to 300°F under pressure.

Figure 15
Cross section of cotton dyed at 210°F

Figure 16
Cross section of cotton dyed at 290°F

In the course of the investigation it became apparent that there were many disadvantages in dyeing continuously from a concentrated dyebath. To overcome some of these disadvantages, a modified method was developed, which consisted of first padding the cloth with an aqueous solution of dye at normal (below 212°F) temperatures and then developing the padded cloth in an aqueous bath at elevated temperatures. Padding offered a very convenient method for controlling the shade and also a practical way for feeding dye into the machine at the desired rate.

As a result of the success obtained with these laboratory and semicommercial machines, the Bachmann Uxbridge Worsted Corp has constructed a continuous dyeing machine of 62-inch width. This equipment consists of two main parts, a padder and a pressure chamber for dyeing and developing.

The padder consists of a stainless-steel immersion or pad box and two rubber rolls, each roll being 76¼ inches wide and 18 inches in diameter. Pressure is applied to the squeeze rolls by air and must be adjusted so that it is greater than the pressure on the sealing rolls.

After being padded, the cloth passes into the pressure chamber through a set of sealing rolls, which were designed to hold back 50 lb of pressure per square inch while in motion. These sealing rolls consist of two steel rolls with a rubber roll pressed against them. Air is prevented from leaking around the sides and ends of the rolls by an elaborate set of cross seals.

After passing through the pressure sealing rolls the cloth enters the tank containing the developing or dyebath, which is at an elevated temperature. The developing tank contains approximately 1500 gallons of solution and at present can accommodate cloth up to 62 inches in open width. The developing tank holds about 42 yards of cloth, and the immersion time can be varied by controlling the running speed. The whole machine is operated from a single panel board. On this panel are controls for varying speed, immersion

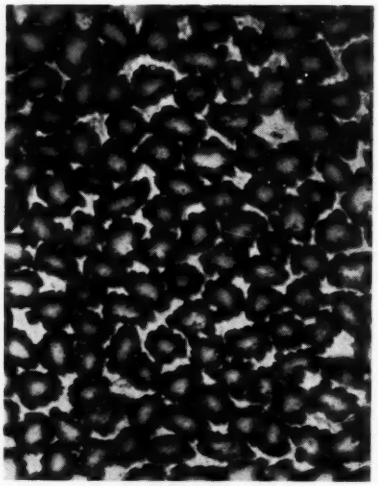

Figure 18
Cross section of viscose dyed at 210°F

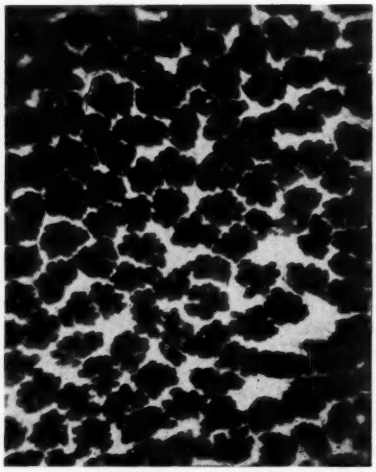

Figure 19
Cross section of viscose dyed at 290°F

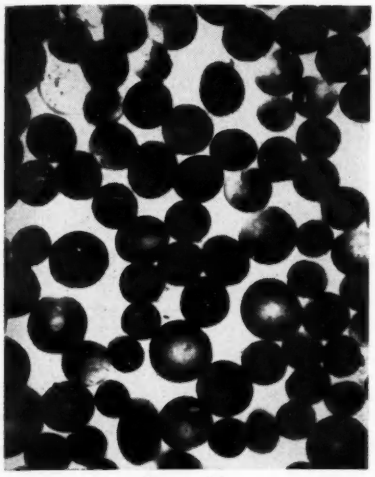

Figure 20
Cross section of Aralac dyed at 210°F

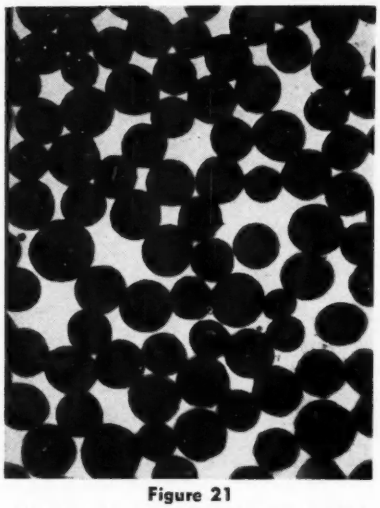

Figure 21
Cross section of Aralac dyed at 290°F

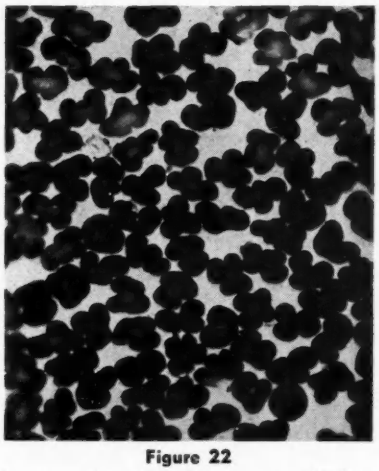

Figure 22
Cross section of acetate rayon dyed at 210°F

time, temperature, pressure, feed pumps to padder and to the developing tank, circulation pumps, volume level, and pH. Cloth, after being prepared and dried, passes through the pad box and squeeze rolls, where a controlled amount of dye is applied. The wet padded cloth passes over a set of speed-compensating or dancer rolls and then through the top nip of the sealing rolls into the pressure chamber. After passage over a second set of compensating or dancer rolls, the cloth now enters the developing solution, where it is dyed in a few minutes at an elevated temperature. The dyed cloth passes through a set of squeeze rolls at the end of the developing tank, over another set of compensating or dancer rolls and finally out of the pressure chamber through the lower nip of the seal rolls. The dyed cloth is then ready for rinsing and finishing.

OTHER PRESSURE-DYEING EQUIPMENT———The Barotor *(2)*, recently developed by the Du Pont Company, is a machine for dyeing fabrics at high temperatures by a batch process. The semi-commercial machine, installed at the Newport Textile Laboratory, is designed for 600 yards of 65-inch material and will operate at pressures up to 25 lb gauge in a closed horizontal autoclave. This machine is still under development, but its performance so far has been said to be highly encouraging because fabrics have been dyed without wrinkling and with only a slight tension. Considerable yardage is required to make continuous dyeing operations economical; therefore, batch machines, such as the Barotor, will fill a needed spot, making it possible to dye profitably small lots at high temperatures.

Most of the manufacturers of stock and package dyeing equipment now make machinery for dyeing at temperatures above the boil. Through the installation of new valves, piping and control instruments, many stock and package machines now in use can be converted for high-temperature use. Figure 3 shows a Smith-Drum high-temperature package dyeing machine in the Calco laboratory. Either 1-lb packages or raw stock can be dyed in this machine. Additions to the dyebath can be made during the dyeing without dropping the pressure. Most of the package machines designed for high-temperature dyeing operate at a maximum pressure of 40 lb per square inch gauge and dyeings are made at 250°F or lower. The small advantage gained by dyeing packages at temperatures above 250°F has not been found to offset the extra cost required to build a machine to withstand higher pressures. Considerable difficulty has been encountered with package winding of the new synthetic fibers. A very soft package is required because of the shrinkage that occurs during dyeing.

Figure 4 shows a cross section of X-51 acrylic fiber dyed with 2 per cent Calcosyn Blue G for 20 minutes at 250°F in the laboratory package machine. Figure 5 shows a similar dyeing on Dacron polyester fiber. Figure 6 shows Orlon acrylic staple fiber dyed for 20 minutes at 250°F with 2 per cent Calcosyn Blue G, and Figure 7 shows a similar dyeing on Orlon acrylic filament made at 250°F for 20 minutes.

PRINCIPLES OF HIGH-TEMPERATURE DYEING———Regardless of the type of equipment or whether a batch or continuous process is used, there are certain principles of dyeing which are common to all. A brief discussion of some of these principles follows.

According to nearly all of the current theories, dyeing takes place by the diffusion of the dye molecules along intermicellar spaces. In other words, on placing the fiber in the dyebath, swelling takes place, resulting in areas through which dye can diffuse. Speakman, Stott and Chang *(19)* have shown, experimentally, that the swelling of a wool fiber in water increases with rise of temperature. It is well known that the rate of diffusion is increased by a rise in temperature and is also increased as the size of the molecule becomes smaller. Most acid and direct dyes are salts of dye acids. These dyes may exist in solution as ions, as molecular dispersions, or as colloidal dispersions. The work of Valko *(21, 23)* and of Robinson and his collaborators *(7, 11-14)* has shown that few dyes are dispersed in aqueous solutions as single molecules, although many probably exist as simple aggregates of 2 to 10 molecules. Many others have aggregation numbers of 100 or higher. Depending upon the degree of aggregation, the actual size of the dye particle in solution will vary, and this, in turn, will determine whether it is possible for the dye to enter the fiber by way of the intermicellar spaces. It has been found, as reported by Valko, that the degree of aggregation varies with temperature; hence, it is possible to have a colloidal solution at room temperature which changes to a semicolloidal or nearly true solution at higher temperatures. The diameter of the capillary pores in viscose cellulose, calculated from measurements of permeability to water, is of the same order as the length of a typical direct cotton dye molecule *(6, 8)*. The word "pore" is used here as in the referred literature. Actually, these are probably a network of cellulose chains which act like pores and are not necessarily continuous or like capillary tubes of a known cross section. Since it is

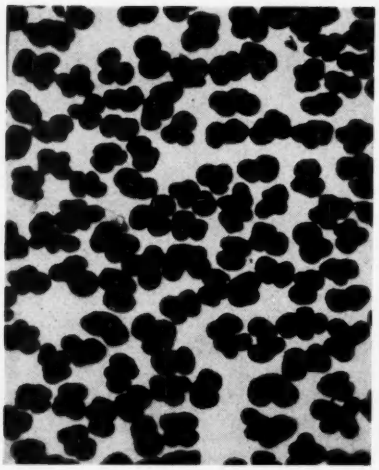

Figure 23
Cross section of acetate rayon dyed at 290°F

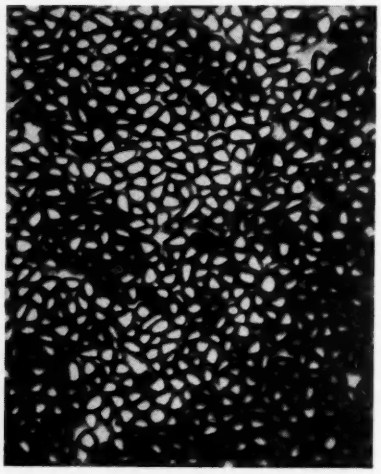

Figure 24
Cross section of silk dyed at 210°F

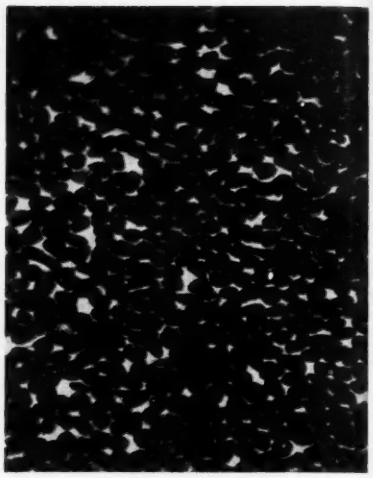

Figure 25
Cross section of silk dyed at 290°F

thought that these pores are responsible for the transport of dye to the interior of the fiber, it is almost certain that the dyes are absorbed molecularly and not as dye micelles *(8, 22)*. Thus, it is evident that high temperatures promote dyeing by increasing pore size, decreasing the aggregation of the dye and increasing the rate of diffusion.

MEASURED DYEING EFFECTS——— In Figure 8, the dye color strength, measured by per cent reflectance, of wool samples dyed for 50 seconds in a 3 per cent solution of Calcocid Wool Blue B is shown plotted against the temperature of dyeing. From this curve, it can be seen that the dye color strength of the wool increased from 100 to 280 per cent as the dyeing temperature increased from 210 to 290°F. Figures 9 and 10 show the cross sections of the dyeings made at 210 and 290°F. In the short time of dyeing, the one at 210°F shows poor penetration and uneven dyeing from fiber to fiber; the dyeing made at 290°F shows superior penetration and fiber levelness. In like manner, it can be seen from Figure 11 that, in dyeing nylon in a 1 per cent solution of Calcocid Alizarine Blue SKY (C I 1088), the dye color strength increased from 100 to 300 per cent as the temperature of the dyebath increased from 210 to 290°F. Figures 12 and 13 show cross sections of these two dyeings. At the low temperature, the dyeing was a very light blue and, as can be seen in Figure 12, the dye had just started to penetrate into the individual fibers. At the high temperature, the dyeing was a dark blue and the dye had penetrated through the entire fiber. Cellulosic materials did not show as great an increase in color value with an increase in temperature as did the protein materials. Figure 14 shows that the color value of cotton, dyed in a 3 per cent solution of Calcodur Blue 4GL (C I 533), was increased only from 100 to 150 per cent as the temperature was increased from 210 to 290°F. Figures 15 and 16 show cross sections of cotton dyed at 210 and 290°F, respectively. Viscose rayon, dyed under the same conditions as the cotton, showed an increase from 100 to 195 per cent. This was a greater increase than was obtained with cotton but much less than with wool or nylon. This is shown in Figure 17. Figures 18 and 19 show cross sections of viscose dyed at the two temperatures, 210 and 290°F. Cross sections of dyeings of Aralac, cellulose acetate and silk made at 210 and 290°F for 50 seconds are shown in Figures 20 through 25.

If Dacron polyester fiber is dyed with acetate dyes at temperatures below the boil, very little dye is sorbed during a normal dyeing period of one to two hours. At 212°F a few acetate dyes show fair exhaustion, but most of them show poor penetration. Waters *(26)* in England has carried out experiments to find if the poor affinity of Terylene (the English equivalent of Dacron) for acetate dyes was due to the inability of Terylene to absorb sufficient dye or whether it was due to the difficulty of the dye in entering and diffusing inside the fiber. The results were very revealing because they showed that Terylene is actually only slightly less dyeable than acetate rayon and is more dyeable than nylon. However, Waters found that at 85°C these dyes diffuse 500 times faster into nylon than into Terylene. When the temperature was increased from 85 to 100°C, the diffusion coefficient of acetate dyes into Terylene was found to be about 50 times greater. The results of these studies suggest that Dacron should be dyed at high temperatures. Lyle and coworkers *(4)* have shown that the sorption of acetate dyes by Dacron is twice as much and often more than twice as much at 250°F as at 212°F. In general, the dyeing of Dacron at elevated temperatures has resulted in lower chemical costs and improved light fastness *(10)*.

Orlon acrylic fiber can be dyed in light shades with acetate dyes at the boil. The temperature must be 205°F or higher and the dye exhaustion increases as the temperature is elevated. The exhaustion of dyes on Orlon by normal dyeing methods is quite low. Using 10 per cent of a blue acetate dye, Thomas and Meunier *(20)* found that Orlon filament yarn sorbed only 0.21 per cent dye in one hour at 212°F. Thus, 9.79 per cent of the original 10 per cent dye remained in the dyebath after one hour. When 20 g of m-cresol per liter was added to the dyebath, the exhaustion increased to 0.89 per cent. When the m-cresol was omitted and the temperature was increased to 275-279°F, the exhaustion was increased still further to 2.21 per cent. Orlon acrylic filament fiber dyed with acetate dyes at elevated temperatures exhibits excellent wash fastness and a light fastness equivalent to that of the same-strength dyeing on acetate or nylon. The use of elevated temperatures is preferred to the use of assistants such as m-cresol or aniline. These assistant have to be removed from the fiber at the end of the dyeing and this has been found to be a difficult operation.

Other things being equal, the amount of dye taken up by a fiber at equilibrium usually decreases as the temperature is increased, but the rate of dyeing increases *(1, 3, 17)*. The rate of dyeing of protein fibers and the new synthetic fibers is increased far more by a temperature increase than that of cellulosic fibers. This

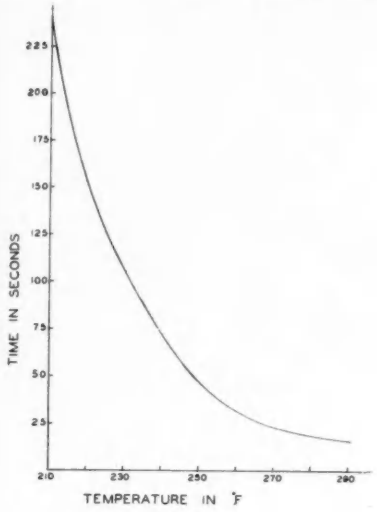

Figure 26
Time vs temperature required to dye wool to the same shade

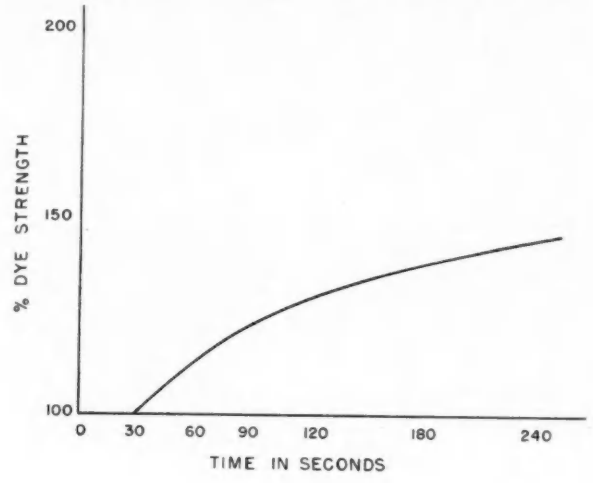

Figure 27
Dye strength of cotton vs time of dyeing

TABLE I
TENSILE CHARACTERISTICS OF WOOL DYED AT HIGH TEMPERATURES

*Temperature of Dyeing**	*Time of Dyeing*	*Tensile Strength in Lb*
°F	*Seconds*	
290	34	1.7
280	40	1.8
270	50	2.0
260	60	2.0
250	100	2.2
240	140	2.1
230	220	2.1
220	300	2.1
210	480	2.2
Undyed wool, blank		2.1

* Dyebath contained 3% solution of Calcocid Wool Blue B (C I 209).

TABLE II
TENSILE CHARACTERISTICS OF FIBERS DYED AT 270°F

		Tensile Strength in Lb	
		Before Dyeing	*After Dyeing*
Cotton unbleached sheeting	warp	40	47
	filling	45	45
Viscose	warp	106	111
	filling	79	76
Nylon	warp	98	109
	filling	88	104
Acetate	warp	60	13
	filling	28	14
Dacron yarn		8.5	8.7

is no doubt due to the necessity for more swelling in these fibers before diffusion can take place than in the case of cellulosic fibers. Diffusion of direct dyes into cellulose, in most cases, is very rapid even at low temperatures.

Figure 26 shows that the time required to dye wool to the same depth of shade in a 3 per cent solution of Calcocid Wool Blue B Conc at 290°F is only one twenty-eighth of the time required at 210°F. At a temperature of 270°F, dyeings of wool and wool-cotton unions that were commercially acceptable have been made in less than 90 seconds. Figure 27 shows how dye color strength on cotton varies with time of dyeing. All of these experiments were made at 270°F in a 3 per cent solution of Calcodur Blue 4GL. The color strengths of the dyed samples were measured by reflectance with a spectrophotometer.

FIBER DAMAGE AT HIGH TEMPERATURES ——— Textile fibers, with the exception of cellulose acetate, do not appear to be damaged when dyed at elevated temperatures if the time of immersion is short. Wool skeins were dyed in a 3 per cent solution of Calcocid Wool Blue B (C I 209) at temperatures varying from 210 to 290°F. The time of dyeing was varied so that all the samples had approximately the same depth of shade. Tensile-strength measurements of these dyeings, given in Table I, show that dyeing wool at temperatures up to 270°F for the times indicated causes no loss in tensile strength within experimental error. At 280 and 290°F there is a slight loss in tensile strength. Table II shows the effect of high-temperature dyeing on the tensile characteristics of several other textile fibers, from which it can be seen that the tensile strength of cotton, viscose, Dacron and nylon is not decreased. Cellulose acetate, on the other hand, is damaged at elevated temperatures. Acrylonitrile fibers also have been dyed with no apparent loss in tensile strength.

DYE DECOMPOSITION AT HIGH TEMPERATURES——From the beginning of the high-temperature dyeing program it has been observed that, when dye solutions were held at elevated temperatures over periods of several hours, some dyes decomposed. The amount of thermal decomposition of a large number of acid and direct dyes in 0.5 per cent concentrations has been determined. Table III shows a few typical examples of the results that were obtained. These tests were made by heating solutions of the dyes at 260°F and a pressure of 30 lb per square inch for eight hours. Dye-color-strength determinations were made on the solutions by measurements in the spectrophotometer. The thermal stabilities of various classes of dyes have been carried out under varying conditions *(4, 9, 10)*, so that now the stability of a fairly wide range of dyes is known.

CONCLUSION

The techniques for dyeing textile materials at temperatures above 212°F have

TABLE III
THERMAL DECOMPOSITION OF DYES AFTER 8 HOURS AT 260°F

Name of Dye	CI No	% Decomposition
Calcocid Alizarine Blue SKY	1088	<10
Calcocid Milling Red RC Conc	430	<10
Calcofast Wool Orange RN	—	<10
Calcomine Brilliant Yellow Conc	365	<10
Calcodur Orange EGL	Pr 72	<10
Calcocid Milling Red G	443	10-20
Calcocid Violet 4BXN	698	10-20
Calcodur Blue SL Conc	Pr 71	10-20
Calcomine Brown BRL	—	10-20
Calcocid Wool Blue SR	208	20-50
Calcocid Milling Yellow 3G	Pr 154	20-50
Calcomine Navy R	—	20-50
Calcomine Red 8B	—	20-50
Calcocid Fast Black B	307	>50
Calcocid Milling Red 3R	275	>50
Calcodur Blue 4GL	533	>50
Calcodur Red 8BL	278	>50

advanced greatly in the last 15 years. By use of these techniques it is now possible to dye fibers in a fraction of the time required by orthodox procedures. These dyeings appear to have fastness properties, tensile strength and other physical characteristics that are equal or superior to those obtained by normal dyeing procedures. As a result of the increase in production and decrease in dyeing costs high-temperature dyeing is no longer a laboratory novelty but has now become a standard commercial dyeing method.

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Membership Applications

August 28, 1953

SENIOR

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Guillermo A Garces—production mgr, Tejidos El Condor, Colombia. Sponsor: H P Hoffmann.

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Lester F Hoyt— mgr, application research, New Prod Div, National Aniline Div, A C & D Corp, Buffalo, N Y. Sponsors: E W Camp, H A Wills.

Victor R Hurka—chief supervisor, "Ponsol" colors technical group, E I du Pont de Nemours & Co, Inc, Chambers Works, N J. Sponsors: C A Sylvester, G H Schuler.

Richard F Jenkins—textile chemist, Pittsburgh Coke & Chem Co, (Fine Chem Div), Neville Island, Pa. Sponsors: K C Ruppenthal, R M Locke.

William Johnson—dyer & finisher, Scranton Lace Co, Scranton, Pa. Sponsors: E A Clark, R E Nickerson.

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(Concluded on Page P638)

Southeastern Section——

PRODUCTION AND PROPERTIES OF ACRILAN*

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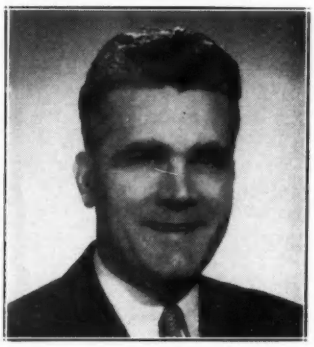
The Chemstrand Corporation
Decatur, Alabama



F J Soday

Acrilan, a wholly synthetic polyacrylic staple fiber containing some copolymer, is described, and its advantages to the textile industry are discussed. Not only is Acrilan claimed to be valuable for the preparation of textiles of excellent handle, appearance, color, warmth, drape, fabric stability, wearability, resistance to creasing and mussing, but it is said to be readily processed into yarns and fabrics over regular machinery for cotton and wool. Of importance to the dyer is that Acrilan can be colored with selected azoics, acetate dyes, vats, acid dyes, metalized-acid dyes and chrome dyes to obtain a full range of shades of good fastness properties.

Besides discussing the properties and uses of Acrilan, the author also presents interesting facts in the historical development and in the manufacture of synthetic fibers in general and of Acrilan staple in particular. The economic significance of synthetics in stabilizing fiber supplies and prices is emphasized.

HISTORICAL INTRODUCTION

THE textile industry today is confronted with the task of studying, evaluating, and using an unprecedented number of new fibers possessing a whole spectrum of unusual properties. Among these new fibers is Acrilan, Chemstrand's acrylic fiber, which has many outstanding properties of interest to the apparel industry. Fabrics made from Acrilan have an excellent hand, can be dyed readily in substantially all colors, are warm without being unusually heavy, and can be kept in good condition with only occasional laundering and dry cleaning.

Synthetic fibers are not entirely new to the textile industry. Rayon, the first of the semisynthetic fibers, was produced in commercial quantities in France in 1891. A plant for the production of rayon was constructed in this country in 1911, and by 1938 rayon and acetate were second only to cotton in terms of annual consumption. Present consumption is equivalent to approximately 20% of our total fiber requirements. Both rayon and acetate are semisynthetic products derived from cellulose, usually in the form of cotton linters or wood pulp, by modification or regeneration processes.

Nylon, the first of the true synthetic fibers, was placed on the market by Du Pont in 1939. Unlike rayon and acetate, which are prepared from a naturally occurring polymer, the nylon polymer is composed of molecules entirely formed by the hands of man according to a specific pattern, starting with chemical raw materials. Nylon was an instant success, and the Du Pont Company has been busily engaged since its introduction in attempting to keep production in some semblance of balance with the constantly increasing demand for the fiber.

Flushed with the successful merchandising of nylon, and heeding the demands of the trade for other fibers having unusual properties, the textile industry has demanded additional fibers which would enable new styling, comfort, and ease-of-maintenance standards to be met. The acrylic fibers Acrilan, dynel, and Orlon, and the polyester fiber Dacron have been developed in response to this demand.

Nylon, the acrylic fibers, and Dacron are derived almost entirely from natural gas, petroleum, coal, limestone, salt, and other readily available raw materials. Man is thus turning increasingly from agricultural sources to minerals for his clothing and fabric requirements.

THE NEED FOR SYNTHETICS

The need for synthetic fibers is not accidental; it is based on a consideration of certain economic factors which make it imperative that man modify his age-old dependence upon the fruits of the soil for both food and clothing. World population has increased rapidly during the past three centuries despite war, famine, and pestilence. Among the Four Horsemen of the Apocalypse, only famine may eventually prove to be the great leveler. There are approximately 2¼ billion people in the world today, and this population is increasing at the rate of 1% per year. Paralleling this increase is an equally rapid decline in the amount of land adapted to food and fiber production because of erosion, improper use, and overcultivation. The available arable land around the world is estimated to be approximately 2½ billion acres, or slightly more than one acre per person. Under optimum growing conditions and the use of intensive cultivation practices, this would be sufficient to meet man's minimum requirements for food and fiber. Unfortunately, these conditions do not usually prevail, with the result that the specter of starvation stalks the globe.

World fiber consumption during the past few years has tended to outrun production. Without the increasing production of semisynthetic and synthetic fibers, a serious fiber shortage would prevail today. The world production of the four principal textile fibers—cotton, rayon, wool and silk—was 18¼ billion pounds in 1950, which is identical with the production of the same fibers in 1936 despite an increase in the output of rayon from 1/3 to 3½ billion pounds during the same period.

In this country, cotton production appears to be stabilizing at the 15-million-bale-per-year level. Determined efforts by the U S Department of Agriculture during the past two years to increase the crop beyond this level were unsuccessful.

With wool, an even more serious situation is encountered. The sheep population of the country has declined from 40 million in 1870 to less than 28 million today. Wool production is now 40% less than it was in 1942, and two out of every three pounds of wool used must be imported. As world consumption has exceeded production by 1½ billion pounds since the end of World War II, declining wool production in the United States has resulted in wide fluctuations in price.

To offset these stationary or declining natural-fiber production potentials, we must turn increasingly to synthetic fibers for clothing and other textile requirements. The rapidity and extent of this conversion will depend largely upon (a) population growth and (b) the availability of land for agricultural purposes.

Our present population is estimated to be 157 million, and it is increasing at the

* Presented in Talladega, Alabama, on Saturday, February 7, 1953.

rate of 7,400 per day or 2¾ million per year. Approximately 2½ acres of land per person is required to maintain our present standard of living.

It is expected that the United States will have a population of 193½ million people by 1975. Some 120 million more acres of land will be required by that date to meet an expected increase in food requirements of 41%. As only 30 million acres can be obtained by draining, irrigation, and clearing, the deficiency must be made up by increasing the yields of food crops per acre and by an increasing dependence upon non-agricultural sources for fibers.

A similar conclusion has been announced by the President's Materials Policy Commission, from which the foregoing data were obtained. While population is expected to increase by 28% and food requirements by 41% during this period, the projected increase in fiber production on farms is 17%. This clearly indicates that the chief function of the new synthetic fibers is to supplement, rather than to displace, the natural fibers.

The total consumption of fibers in this country in 1952 was 6.5 billion pounds, equivalent to a per-capita consumption of 40 pounds (27 pounds of cotton, 9 pounds of rayon and synthetic, and 4 pounds of wool). At this rate of consumption, 100 million pounds of additional fibers will be required each year to meet the needs of our growing population. Additional amounts also will be required to take care of the growing per-capita consumption of fibers, which increased from 20 pounds in 1930 to 30 pounds in 1940 and 40 pounds in 1950.

The 1952 consumption of synthetic fibers in this country amounted to 275 million pounds, equivalent to approximately 4% of our total fiber requirements. The consumption of rayon plus synthetic amounted to 23% of total fiber requirements.

The President's Materials Policy Commission forecasts the production of 975 million pounds of synthetic fibers in 1960, of which 1/3 will be acrylic fibers. The latter is expected to increase to 11.2 billion pounds in 1975. A proportionally greater dependence upon synthetic fibers rather than rayon to supply the needs of the country at that time is based on the increasing difficulties that will be encountered in obtaining cellulose for rayon manufacture, since cellulose is an agricultural product that will compete with food crops for the dwindling per-capita land supply.

MANUFACTURE OF SYNTHETICS

BASIC PRINCIPLES——With the increasing need for synthetic fibers firmly established in view of the foregoing considerations, it may not be out of place to review briefly the basic principles underlying the production of these fibers. These principles were clearly outlined by Robert Hooke in 1664 and comprise (1) the provision of a composition having the desired physical and chemical properties and (2) shaping the composition into filaments of the required size and shape.

Not until the pioneering researches of the late William Hume Carothers and his associates at the Du Pont Company were the rules for formation of high polymers and the properties to be expected from polymers of various structures clearly understood. From this monumental series of researches came nylon, and the synthetic fibers developed since that time have made full use of the basic principles outlined by Carothers. The "composition" required by Hookes procedure had been clearly defined at last.

ACRILAN——In researches carried out in this country and abroad for the past several years, it has been demonstrated that polymers of acrylonitrile are outstanding fiber-forming materials. The pioneering work which led to the development of Acrilan, Chemstrand's acrylic fiber, was initiated in the laboratories of the American Viscose Corporation and the Monsanto Chemical Company in the early 1940's. Later, this work was combined and a joint effort was made to develop a satisfactory acrylic fiber.

The Chemstrand Corporation was formed in 1949 for the specific purpose of producing synthetic fibers. Encouraging laboratory results led to the construction of pilot plants at Dayton, Ohio, to produce solvent; at Springfield, Massachusetts, to produce Acrilan polymer; and at Marcus Hook, Pennsylvania, to produce staple fiber. An extensive textile processing and consumer evaluation program was initiated and pursued with vigor. Because of the excellent co-operation of the textile industry, rapid progress was made in the development of a commercial fiber.

Finally, a decision was made to construct a plant for the production of 30 million pounds per year of Acrilan staple fiber at Decatur, Alabama. The construction work on this plant is nearing completion, and production of Acrilan staple was initiated in August of 1952. Production is expanding as rapidly as the availability of raw materials will permit.

Acrilan is derived almost entirely from natural gas and air. A series of four reactions serves to convert these readily available raw materials to acrylonitrile, which is then polymerized to form Acrilan resin. This is dissolved in a suitable solvent, spun, crimped, and cut to form Acrilan staple.

In 1951, Chemstrand obtained a license for the production of nylon from Du Pont and is now constructing a plant for the production of 50 million pounds of continuous-filament nylon yearly at Pensacola, Florida.

A large research and development center is being constructed at Decatur for the further improvement of Acrilan and nylon. This will include three laboratory buildings, an Acrilan pilot plant and a nylon pilot plant. The staff will total approximately 400, of which some 250 will be technical personnel. As Chemstrand is the only company serving the synthetic fiber industry that is wholly devoted to the production of synthetic fibers, all of its energies will be channeled into the improvement of the quality and uniformity of its present fibers and the development of new synthetic fibers.

ADVANTAGES OF ACRILAN

PRICE STABILITY——An outstanding factor in the growing use of synthetic fibers, and one of great interest to the fabric and apparel industries, is price stability. Wool, which was priced at $1.65 per pound in 1948, jumped to almost $4.00 shortly after the outbreak of the Korean War, settled back to $3.00 by the end of 1950, and is now selling for $1.75. Rayon fluctuated in price between the narrow limits of 36 to 40c per pound during the same period, and nylon was even more stable in price. Based on readily available chemical raw materials, Acrilan undoubtedly will be quite stable in price and will have a stabilizing influence on the price of other fibers.

CONTROL FOR UNIFORMITY——Another advantage favoring the use of Acrilan is uniformity. Made under rigidly controlled operating conditions from raw materials of unvarying quality, it can be produced to meet the precise specifications required by the fabric and apparel industries. As further experience is gained in its production, it is expected that even more rigid specifications can be met.

In the development of Acrilan, it was recognized that a well-balanced program of manufacturing, distribution, and customer service would be required to establish a firm and enduring market for the product. To this end, a large and experienced staff of specialties was provided to insure that the product was tailored to meet the desires of the processor and consumer, an experienced sales force was assembled and provisions made to render all required technical service to the industry, and a large advertising and promotional campaign inaugurated to carry the story of Acrilan quality to the consumer.

As no combination of laboratory tests for fiber strength, extensibility, finish, and crimp can be used to predict textile processability with any degree of accuracy, a textile evaluation laboratory has been set up in the plant. Comprising a picker, card, drawing frame, roving frame, and spinning frame, the laboratory serves as a quality-control unit, and production samples are completely evaluated at frequent intervals. This will be supplemented by even more complete textile-laboratory and processing facilities in the research department.

PHYSICAL PROPERTIES——The outstanding characteristics of Acrilan are

1) ready processability on conventional textile machinery,
2) a characteristic good hand,
3) warmth without weight, and
4) ready dyeability.

Acrilan has been engineered with the requirements of the immediate customer and the consumer clearly in mind. In common with many other synthetic fibers, Acrilan fabrics are easily washed, dry quickly, resist wrinkling and recover quickly from mussing, retain creases, resist moths and mildew, are strong, drape well, and are long wearing.

Acrilan is being produced in 3- and 5-denier sizes, with staple lengths ranging from 1½" to 5". It is available in both bright and semidull forms. The production of finer deniers is being studied, and some work is being carried out on the production of tow.

In cross-section, the fiber ranges from elliptical to lima-bean in shape.

Acrilan has an average dry tenacity of 4.25 grams per denier and an extensibility of 19%, as measured on 3-denier filaments.

Yarns spun on the cotton system (30/1) have a lea skein product of 2000, a single end product of 370, and an extensibility of 11%. Wet strengths are somewhat more than 90% of the dry strengths.

MILL-PROCESSING ACRILAN —— Probably the most important single property of Acrilan, from the standpoint of the textile industry, is the ease with which it can be processed into yarns and fabrics on the standard cotton and woolen machinery with which customers mills are already equipped. It presents no static problem because of the close attention given to the developments of a suitable finish. The fiber can be run quite satisfactorily at a relative humidity of 50 to 55% at 75 to 80°F. No additional finish application is necessary unless the fiber is stock-dyed before processing.

Acrilan, with a specific gravity of 1.135, is a bulky fiber. This must be kept in mind in processing to obtain satisfactory results. On the coton system, since the staple opens readily, the use of all-cotton-type beaters, openers, and cleaners should be avoided. A standard hopper feeder is all that is required.

In carding, a 40- to 50-grain sliver is best, at a card production of 10 to 12 pounds per hour. At drawing, the drafts, settings, and roll speeds common for rayon are satisfactory. In roving, the lay should be increased and tension adjusted to compensate for the bulky nature of Acrilan. In spinning, a twist multiple of 3.50 has given the best spinning and strength properties.

On the worsted system, the stock can be fed directly to the Bramwell feed without previous picking, carding is normal with 2 ounces per 55-yard delivery, and in subsequent gilling prior to combing, the delivered weight is approximately the same as that of wool. Combing is normal, and in finishing operations a 3-ounce end is made. In drawing and spinning operations, Acrilan production is equal to that of good wool.

On the woolen system, no changes in card settings over those used for rayon are necessary, and Acrilan stock may be fed directly to the breaker card without picking.

An unsolved problem, which Acrilan shares with all hydrophobic fibers, is a satisfactory size for 100%- Acrilan warp. This problem is being investigated with all vigor, and promising results are being obtained with polyacrylic acid formations.

Acrilan has the warm touch and bulk so characteristic of wool. The specific gravity of Acrilan is 1.135, which places it among the lowest of all textile fibers. This is of considerable interest to both the textile designer and the mill operator, contributing to high bulk and coverage for the production of unusually low-weight fabrics. The loftiness of Acrilan fabrics affords a reasonable basis for our claim of unusual warmth of these fabrics without undue weight. The thermal efficiency of Acrilan is one of its outstanding features, being equal to that of wool on a volume basis and beter than wool on a weight basis. This loftiness and covering power is beyond that to be expected from the design of the fabric alone, and repeated tests have indicated that Acrilan fabrics insulate very effectively. Blankets now on the market made from Acrilan are specific examples of this warmth without weight.

While we cannot prove our claim for a very good hand for Acrilan by objective tests, we have been encouraged by the almost universal agreement among textile experts that the hand and touch of properly prepared Acrilan fabrics and garments are outstanding.

DYEING PROPERTIES——In tailoring Acrilan to the consumer market, it was decided that the most important single factor influencing customer acceptance was the provision of a full range of colors. To this end, we have given more attention to imparting the property of ready dyeability to the fiber than to any other property. As a result, Acrilan can be easily dyed with only minor modifications of standard dyeing techniques on modern dyeing equipment. Expensive dyeing assistants are not required.

Acid dyeing has been successfully applied to Acrilan to acquire a range of brilliant colors with good wash fastness and crocking characteristics. Union dyeings with wool appear possible in light to medium shades with many acid dyes.

Chrome dyes are applied to Acrilan in substantially the same manner as acid dyes, with the exception that slightly more acid is required for complete exhaustion. Chrome dyes must be selected with some care, since certain chrome dyes do not respond entirely successfully to chroming on Acrilan. Chrome dyeings are generally excellent in light and wash-fastness characteristics.

Premetallized acid dyes may be used on Acrilan under conditions which are practically normal for wool, making available a range of colors with fastness properties intermediate between the acid and chrome dyes.

Selected azoic dyes may be applied to Acrilan with beta-hydroxynaphthoic acid to yield colors with acceptable light fastness and generally excellent washfastness.

Acrilan shows a moderate affinity for acetate dyes, which may be readily applied from neutral solutions at the boil. Light fastness ranges from good to excellent. Union dyeings with rayon may be obtained by cross-dyeing with acetate dyes on the Acrilan component and direct dyes on the rayon.

Vat dyes have a fair affinity for Acrilan and are best applied in light shades as the sulfuric acid esters of the reduced dyes. The use of high temperature with normal vat dyes has given fastness ratings on Acrilan in some cases better than that of the older fibers. Union shades with rayon can be obtained with a one-bath, two-step process, the rayon being dyed at lower temperatures and the Acrilan component at higher temperatures.

From this wide variety of dyes which may be applied to Acrilan, a veritable spectrum of shades may be made available to the designer for the fabrication of garments having excellent consumer appeal.

FABRIC PROPERTIES——Like other synthetic fibers, the resistance of Acrilan to attack by mildew, mold, moths and other insects, and microorganisms is outstanding. This is important from the consumer stand-

point, as the annual loss resulting from moth damage alone in this country has been estimated to be $100 million.

Acrilan is a hydrophobic, or moisture insensitive, fiber. It has an average moisture regain of 1.6% at 70°F and 58% relative humidity. The shrinkage in boiling water is less than 2%. Fabrics and garments prepared from Acrilan therefore resist wrinkling and mussing and retain pleatings and creases.

CONCLUSION

These are important considerations in view of changes which have been made in our way of living in recent years. Yesterday's housewife spent most of her time in the home and there was time for frequent pressing and protection against moths. Today's housewife, however, is likely to be a partial breadwinner, who has to maintain a well-groomed appearance at work and at various social functions on a limited budget of time and money for attention to cleaning and pressing. Garments which may be easily laundered and quickly dried, which recover quickly and completely from mussing, and which wear well and maintain a fresh appearance for a long time are the answer to her needs. Garments made from Acrilan meet these exacting demands, and they may properly be designated as garments designed for modern living.

Two Students Papers to Be Presented at Alumni Luncheon

A FEATURE of the Alumni Luncheon, to be held September 17th in the Grand Ballroom of Conrad Hilton Hotel, Chicago, during the AATCC Convention, will be the presentation of papers by two student members of the Association. Abstracts of the papers follow:

Fastness Properties of Acetate Dyes Aftertreated with Curable Resins

JAMES M POLITO
Fairleigh Dickinson College

The effect of curable resin finishes on the fastness of direct dyes on viscose has been studied. The effect of these resins on the acetate component of mixed fiber fabrics, however, has not been published. Therefore, a study of representative series of acetate dyes with special reference to the effect on light and gas-fading properties, of acetate colors aftertreated with urea-formaldehyde, melamine-formaldehyde and water-repellent finishes has been made. This paper should be of special interest to dyers and finishers throughout the country.

Dyeing Union Shades on Blends of Dacron or Orlon with Wool

LONNIE T HOWARD
Clemson College

To date, the dyeings of wool-synthetic (Orlon, Dacron) blends has been practically impossible except in the raw state, a condition undesirable to the textile industry.

In attempting to find a practical method of dyeing these blends, we used two different approaches. First, the production of solid shades on the wool and synthetic fibers with a single class of dyestuff, and secondly reaching this same objective by using more than one class of dye; that is, by cross dyeing.

We feel that this research gives promise of a possible practical method of producing fast color on woven or knitted goods of various synthetics, either alone or blended with wool.

Membership Applications—

(Concluded from Page P634)

SENIOR

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Wallace S Russon — assistant chemist, Kroy, Inc, Lowell, Mass. Sponsors: W Akam, K E Chambers.

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Max A Stauber—director of Quality Control Dept, Iselin Jefferson Co, New York, N Y. Sponsors: H Moore, W J Helmus.

Shohei Sumi—mgr of Material Dept, Tsuyakin Kogyo K K, Okoshi, Japan. Sponsors: C Z Draves, G E Neisser.

James C Talley—executive secretary, Jefferson Woolen Mills, Knoxville, Tenn. Sponsors: W D Blackman, Jr, M S Morrison, Jr.

Isamu Tanaka—chief of Tech Div, Japan Woolen Textile Co, Kobe, Japan. Sponsors: C Z Draves, G E Neisser.

Aldo L Tarigo—technical assistant, Pacific Mills, New York, N Y. Sponsors: J F Corbett, C H Huggins.

Edmund H Webb—asst supt, bleachery, Utica-Mohawk Div of J P Stevens, Clemson, S C. Sponsor: C O Stevenson.

Yasusaku Yoshida—member of Purchasing Dept, Kanegafuchi Spinning Co, Osaka, Japan. Sponsors: C Z Draves, G E Neisser.

JUNIOR

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Robert M Williams—chief dyer, May Hosiery Mills, Nashville, Tenn. Sponsors: R D Blum, Jr, E E Burgner, Jr.

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CORPORATE

Jefferies Processors, Inc
Regal Chemical Co

APPLICATIONS FOR TRANSFER TO SENIOR MEMBERSHIP

Charles S Baker
Irving W Feyler, Jr
Raymond W Hargrove
Albert G Hoyle
Robert C Hurt
Joseph J Iannarone, Jr
George C Kantner
Herbert W McNulty, Jr
Joseph J Miranowicz
Frank R Padula
Robert N Pennie
William H Roeper
Joe R Stilwell
H Arnold Strauch
Norman W Touchette

Patent Digest——

(Concluded from Page 620)

SIMULTANEOUS VAT DYEING AND STABILIZING——— Cellulose Ether and Formaldehyde C,4, 02

USPat 2,628,151
(American Viscose Corp—Walmsley, Smith—Feb 10, 1953)

Fabrics to be stabilized and vat dyed require two separate treatments, each involving many operations. The purpose of the present invention is to dye and stabilize in the same process. The single steps comprise: preparing (desizing, scouring), applying the vat pigment and the stabilizing agent simultaneously, drying, curing, reducing the vat pigment, reoxidizing and finally subjecting the goods to the standard scouring and finishing operations.

While cellulose ethers used as stabilizing agents are reported to be unsatisfactory they have the property of stabilizing against progressing dimensional shrinkage but not against "pulling out" during final finishing treatments. On the other hand, the usual resins, such as the urea-formaldehyde condensates, retard after curing the reduction process of vat pigments to be inserted after stabilization.

This problem has been solved by using water-insoluble, alkali-soluble cellulose ethers, combined with formaldehyde as the stablizing agent. Vat pigments are dispersed in an alkaline composition in the presence of a plasticizing agent (sorbitan monopalmitate and trilaurate), after which the pH is adjusted to 1.2-6.5 by adding a strong mineral acid, such as sulfuric acid, which, being present in excess, not only neutralizes the alkali but acts at the same time as a catalyst.

Example: an alkali-soluble type of hydroxyethylcellulose is wetted in water for about 12 hours and thereafter solubilized with NaOH. Indanthrene Blue BCSN double paste (Pr 115) is mixed with the alkaline solution and a plasticizer (as mentioned above) and finally with formaldehyde. Sulfuric acid 20% is used to bring the pH down to 1.3 Rayon fabric padded in this bath is cured on a tenter frame. The following reduction of the vat pigment is brought about with alkaline hydrosulfite and the vat is reoxidized with sodium perborate. Comparative results show very good results even after five washing operations.

Any vat dyestuff (indigoid, anthraquinoid, etc) may be applied in this process.

Under present conditions the *cellulose ether and the formaldehyde act jointly* to stabilize the fabric after the aldehyde is cured (Column 3, 53-66). Thus, it is assumed that there is no reaction between these components. Both agents combined produce the improved stability against dimensional shrinkage, which is obtained by applying the cellulose ether, and against "pulling out" during final finishing, obviously due to the action of formaldehyde.

Among the references cited by the Patent Office:

USPat 2,441,859 (Alrose/1948): protecting against shrinkage by applying aldehydes in the absence of acidic catalysts. [Cf *Am Dyestuff Reporter* 37, 768 (1948)].

USPat 2,205,120/1940 (Heberlein) and USPat 2,108,520/1938 (Boehme Fettchemie): shrinkproofing and wrinkleproofing by using acid aldehyde treatments.

USPat 1,816,973/1931 (Kantorowicz): increasing resistance of fiber strength by a formaldehyde treatment.

USPat 1,744,140 (General Aniline/-1930): printing vat dyes, dispersed in oxyethylcellulose thickeners, reducing in a separate step and aging (the "Colloresine" method).

STABILIZING Rayon-Aldehydes or Ketone-Aldehydes plus Alkali-Soluble Cellulose Ethers G, 2, 04

Brit P 688,135
(American Viscose Corp—Feb 25, 1953)

It has been suggested that rayon fabrics be stabilized with acetone-formaldehyde condensates (see references below), but this method reportedly does not give a sufficient stabilizing effect to a degree required by the trade. On the other hand, cellulose ethers have been applied for the same purpose: to improve the stabilization while not resisting further tensioning ("the pull out"). Cellulose-ether-stabilized fabrics subjected to tension shrink back after washing to the same dimensions they had before tensioning.

The present patent covers a process that is said to give permanently stable effects in this respect with a treatment in an alkaline liquid containing an aldehyde or a ketone-aldehyde condensate and water-insoluble hydroxyethyl cellulose. After the fabric is impregnated with this solution it is dried under relaxed conditions, e g, on a loop drier, passed through an acid and dried at about 260° F, whereby the cellulose ether is insolubilized. An alternative process comprises drying and setting at 280° F whereby the cellulose ether is coagulated at the same time. It is assumed that the aldehyde or the aldehyde-condensate reacts with free hydroxy groups of the cellulose ether and/or with the hydroxy groups of the fibrous material. Finally, excess alkali is removed in this event.

Aldehydes and ketones are precondensed under controlled conditions by using small amounts of alkaline catalysts (optionally, alkali phosphates). Thereafter excess catalyst may be removed by carefully neutralizing or, when alkali phosphates are present, by the precipitation with barium chloride. The precondensate is a viscous liquid, miscible with the alkaline cellulose ether impregnating solution.

Two examples are offered. In the first, cellulose ethers plus aldehydes are applied, while in the other these ethers are combined with aldehyde-ketone condensates. In the latter event, a baking process (at about 300° F) following the drying operation is required. A table bears out superior shrinkage stability after 5 washing cycles.

USPat 2,486,399 (Dan River Mills) describes a shrinkproofing composition, the reaction product of starch-acetone-aldehyde; according to page one, line 21 of this specification, polyhydroxy compounds, such as hydroxyethylcellulose, may be used in place of starch, but a practical application of this special compound is not mentioned in the text nor in the claims of this patent [cf *Am Dyestuff Reptr 39,* 99 (1950)].

USPat 2,628,151 of American Viscose Corp (see preceeding patent abstract) advocates the use of formaldehyde plus alkaline solutions of hydroxyethylcellulose for attaining shrink resistance in conjunction with vat dyeing processess. The reaction of water-insoluble, alkali-soluble hydroxyethylcellulose with formaldehyde and/or fiber material is explained the same way as in the present patent.

NEWS

• Cotton Transformed into Structurally Different Type Fiber by New Process

L H Hance, president of the Institute of Textile Technology, Charlottesville, Va, has announced the successful development of a new "family of fibers" from cotton. The new series, designated as T-7, is produced by the reaction of ordinary cotton fiber, yarn or fabric with acrylonitrile during a basic process known as cyanoethylation.

The new series is said to retain the appearance, "feel" and other characteristics of cotton while taking on these added features: 1) permanent resistance to microorganisms, 2) greater strength retention after exposure to wet and dry heat, and 3) greater receptivity to all classes of dyes (including acid dyes).

Jack Crompton, ITT technical director, who initiated and supervised development of the T-7 series over the past 3½ years, points out that the T-7 products are "very versatile." As a base product they are said to be easily alterable by subsequent treatment into products having even more desirable qualities. In certain instances, according to Dr Crompton, further treatments have produced fibers and yarns that are considerably stronger and possess increased stretch and greater abrasion resistance than either the original cotton or T-7 products.

The process is said to be the first to achieve chemical modification of cotton in conventional yarn-package-treating equipment. With this equipment, both yarn and fiber can be processed, it is claimed. The process is described as "relatively simple."

Feasibility of the process has been demonstrated by commercial scale runs in conventional yarn-treating equipment at Standard-Coosa-Thatcher Company, Chattanooga, Tenn, according to Aubrey A Hobbs, S-T-C vice-president. Plans are nearing completion for larger-volume production in pilot plant facilities of certain other member mills, it is reported.

• Mona Names Southern Representative

Mona Industries, Inc, Paterson, N J, have appointed Ralph Gossett and Company, 8 South Church Street, Greenville, S C, as their exclusive representatives for North Carolina and Sullivan County, Tennessee. The firm will handle Mona's line of yarn conditioning machinery and chemicals, as well as other products for the spinning, weaving and knitting fields.

• Metro Dyestuff Introduces Emboprint Colors for 3-Dimensional Printing

Metro Dyestuff Corporation, West Warwick, R I, has concluded an exclusive agreement with Plastex GmbH, Krefeld, Germany, an affiliate of Dornbusch Machinery Company, also of Krefeld, for the exploitation in the United States, Canada, Cuba and Mexico of the inventions covering printing colors for simultaneously embossing and printing of cellulosic fabrics, for which patents are pending. The products will be marketed under the tradename Emboprint by Metro-Atlantic, Inc of Centredale, R I, exclusive sales agent for Metro.

Harry W Grimmel, president of Metro Dyestuff Corp (left), and Ernest Nathan, chairman of the board, Metro-Atlantic, Inc examine an Emboprinted fabric.

The Dornbusch Company in Krefeld, Germany, in the last few years developed embossing machines to create durable embossed effects on resin-treated cotton fabrics. They also invented a process of simultaneous embossing and emboss printing.

Valley printing or embossed printing has been held back chiefly by the lack of dyes or inks that will withstand the required high temperatures (385-450°F). In order to overcome such a void, Dornbusch initiated research to make such colors available. For the purpose of development, Dornbusch, with others, started the Plastex Company.

Metro is currently installing equipment to produce a full range of Emboprint colors, which will be fast to dry cleaning, laundering and crocking. These new high-temperature colors are expected to have an important affect in the field of cellulosic fabric design, and accordingly, Metro Dyestuff Corp has ambitious plans to promote the name Emboprint. Among these is the use of a tag that will be issued to identify Emboprint-treated fabrics. This tag will be numbered to enable the quality control laboratories of Metro to follow through for the protection of their customers.

• 2nd Conference on Chemical Finishing, NCC

Cotton as a basic raw material for many types of new fibers will be the subject of the second conference on chemical finishing, which the National Cotton Council will sponsor October 8 and 9 at the Statler Hotel, Washington, D C.

The new family of fibers derived from cotton by reaction with acrylonitrile, designated as T-7 by the Institute of Textile Technology in Charlottesville, Virginia, will be described in a paper by Jack Compton, ITT's technical director.

Progress in partial acetylation and other chemical modifications of cotton pioneered by the Southern Regional Research Laboratory of the USDA will also be reported at the conference.

The conference will be attended by representatives of the chemical, finishing, and cotton manufacturing industries.

• NFT to Celebrate 80th Anniversary

The National Federation of Textiles, Inc, an association of firms producing fabrics of man-made fibers, will celebrate its 80th anniversary at a dinner and fashion show to be held at New York's Waldorf-Astoria Hotel the evening of October 6.

It is expected that the dinner and fashion show will serve as a springboard for a long-range promotional campaign in behalf of man-made fibers and fabrics.

• Builders Iron Foundry Changes Name

Builders Iron Foundry, one of New England's oldest corporations, is to become B-I-F Industries, Inc.

The Company, a pioneer in the development of a wide variety of equipment employed in metering, feeding and control in water filtration and sewage disposal plants, adopted the name Builders Iron Foundry in 1853. It was appropriate at the time, since its business was making castings for the building trades. When in the '90's the company began the manufacture of meters it was still appropriate as the Venturi Tubes and even the instruments were largely of cast iron. However, as new materials and manufacturing methods evolved, the use of castings has been steadily decreasing; now the output of the foundry represents less than 10% of the company's total business. Today more parts come from the sheet metal shop than from the foundry.

Builder's Iron Foundry's customers are said to find it difficult to believe that a foundry manufactures the precision equipment made by the subsidiary companies under Builders Iron Foundry. In 1941, trying to overcome this handicap, Builders-Providence, Inc was incorporated to conduct the metering, instrument and filtration equipment business. In 1933, %Proportioneers, Inc%, a manufacturer of equipment for the proportional feeding of liquid chemicals, became associated with Builders Iron Foundry. In 1944, Omega Machine Company, manufacturers of chemical feeders became a subsidiary.

As the company's business grew, Builders-Providence, Inc, Omega Machine Company and %Proportioneers,Inc% were placed as associates of Builders Iron Foundry. It was obvious, however, that "Foundry" in the parent company's name still had an adverse effect upon the company's operations.

Therefore, the Company has decided that the name B-I-F Industries, Inc would be more appropriate. The initials B-I-F perpetuate the past history of the company, while at the same time the new name gives a better picture of its actual operations and eliminates confusion arising from the former name. Builders Iron Foundry will be continued but will be restricted to foundry sales.

• New Thermomat Representatives

Thermomat Company, Inc, Trenton, N J, manufacturers of radiant panels, have announced the appointment of Wyrough and Loser, 143 E State St, Trenton, as manufacturer's representatives.

• Connecticut Research Firm OK's Flameproofing Compounds for Cotton

The York Research Corporation of Connecticut has approved for hotel and industrial use the first durable flameproofing compounds for cotton fabrics.

A series of tests run on bed tickings and work clothing fabrics treated with the "Permaproof" process of Treesdale Laboratories and Textile Processing Co, Pittsburgh, were disclosed in a report from Warren C Hyer, vice president of York Research, stating that the fabrics had withstood direct flame tests without igniting and that repeated washings had failed to destroy the fire-retardant properties of the finish. Tests for char and afterglow also showed that these factors stayed well within prescribed limits, it is reported.

According to John A Beattie, Treesdale president, this is the first time a testing laboratory had approved adoption of a durable or "permanent" finish for bed tickings, one of the major sources of hotel fires.

According to the York report, the tests for flame-resistance were based on ASTM Tentative Specifications D-626-41T, which provides that adequately flameproofed materials shall not continue flaming for more than 2 seconds after the igniting flame is removed, that the average length of char shall not exceed 3½ inches, nor the maximum 4½ inches, and that the afterglow shall not continue to consume material past the char length or be of excessive duration. In all cases, Hyer reported, the results not only met but exceeded specification requirements.

The washing tests, based upon ASTM Commercial Laundering Test D-435-42, reportedly involved 10 harsh launderings of 45 minutes duration each at a temperature of 160°F. Soap and soda ash were used in each solution, and the sample fabric was then ironed at 275-300°F. Results of testing for breaking and tear strength also were pronounced satisfactory.

• New Ad Agency Formed in N J

A new advertising agency, under the name of Josephson, Gulick & Cuffari, has been formed with offices at 427 Bloomfield Ave, Montclair, N J.

The three partners are widely experienced in advertising and merchandising, and all have broad agency background. Paul Josephson, president, and Donald S Jones, vice-president, will service accounts. Charles F Gulick functions as copy director and Thomas P Cuffari as art director, and both will handle some accounts as well.

• TRI to Extend Dyeing Research Project

Textile Research Institute, Princeton, N J, has announced that the Dyeing Research Project, has been established for another five years of study. The original project was set up in 1948 with the long-range objective of gaining more basic information on the physical chemistry of dyeing. Decision to continue the work was based on a final report of the first five years of work submitted by H J White, Jr, director of the project, at a meeting of the Project Advisory Committee on March 21.

One of the more interesting phases of the work of the past five years has been the use of radioactive tracers for studying dyeing phenomena. These tracer techniques reportedly have permitted accurate simultaneous measurement of the uptake by single fibers of the dye molecule and other components of the dyebath such as salt and acid ions. The results of these experiments and others not employing tracers have been explained with some success by a theory based on thermodynamic and statistical mechanical concepts. Results obtained thus far may all be interpreted as absorption onto specific chemical sites in the fiber with the various other components of the dyebath competing with the dye molecule. For example, for one acetate dye, less dye was absorbed in an acetate fiber from a half-saturated methyl alcohol solution than from a half-saturated benzene solution, although methyl alcohol swells acetate 39% whereas benzene produces no swelling. This appears to indicate that the methyl alcohol competes with the dye for absorption sites to the extent that the swelling advantage of methyl alcohol is counterbalanced.

The new program will involve intensive experimentation, using techniques developed in the past work. It has been decided to concentrate on viscose rayon and acetate as examples of ionic dyeing and nonionic dyeing, respectively. Nylon will also be studied as an example of a relatively hydrophobic fiber which can be dyed both by ionic and nonionic methods. Firms which have decided to support the new program are: American Enka Corp, American Viscose Corp, Sidney Blumenthal & Co, Inc; Celanese Corporation of America; Cranston Print Works Co; Deering Milliken Research Trust; E I du Pont de Nemours & Co, Inc; Globe Dye Works Co; North American Rayon Corp; Pepperell Manufacturing Co; and Sandoz Chemical Works, Inc.

• NETF Plans to Award Nine Scholarships in 1954

Nine high school graduates who attain highest scores in the 1954 competitive examination will be awarded scholarships valued at $2000 each to finance study in New England textile schools, according to plans of New England Textile Foundation.

Scholarships will be awarded on the basis of a competitive aptitude test given by the College Entrance Examination Board in March of 1954. The nine students with highest scores will receive scholarships provided their high school educational background is adequate and references from their high school principals are satisfactory.

Any high school graduate, or any high school senior, who is an American citizen and will not be over 25 years of age on July 31, 1954, is eligible to compete.

The new $2000 scholarships, according to the NETF, will be payable to winning students at the rate of $250 per semester or $500 per year for four years, provided the student's marks are maintained at a satisfactory level.

Scholarships may be applied on expenses for study at any of four New England colleges offering textile education including Bradford Durfee Technical Institute, Fall River, Mass; Lowell Technological Institute, Lowell, Mass; New Bedford Textile Institute, New Bedford, Mass; and the Textile School of Rhode Island School of Design, Providence, R I.

NETF points out that the scholarships are adequate to pay for tuition and for a good part of living expenses at three of the textile colleges, and will pay for all but $50 yearly of tuition at the fourth school.

"It seems like a good opportunity for any young person," according to a NETF spokesman, "in view of the high demand for trained technicians throughout the textile industry. This year's crop of trained graduates had their choice of three or four placement opportunities apiece, at starting salaries that would have been unheard of only a few years ago."

Applications for entry in the competitive examination that will decide the winners are now being accepted. Students wishing to compete are invited to write for application blanks to New England Textile Foundation, 31 Canal Street, Providence 3, R I. The only expense connected with the scholarship competition is the $6.00 fee charged by the College Entrance Examination Board.

As in years past, the competition and scholarship awards are approved by the National Association of Secondary School Principals.

W F Zipse

• President and Company Celebrate 50th Anniversaries

Geigy Company, Inc, in the United States and Canada, and its president, William F Zipse, celebrated their 50th anniversaries this year almost simultaneously, an unusual story of the man and his company growing up together.

While Geigy years before had made its mark in the European dyestuff industry, it cannot be said to have established itself in the United States and Canada since John J Keller & Co, Geigy representatives from 1870, was a comparatively small organization. It was the Keller organization which Mr Zipse joined one month before Geigy purchased the operation and created the Geigy Aniline and Extract Company (July 1, 1903).

Mr Zipse, while rating high as a student in school, was compelled, as the oldest, to think first of his rather large family and its support. As a consequence, his formal education ended with his obtaining working papers as he turned 14 years. Even during his school days he managed to supplement the family income by maintaining a newspaper route, by acting as a delivery boy for various stores catering to the Gramercy Park residents in New York City and serving in various capacities in a neighborhood furniture store.

Mr Zipse was fully determined to become a salesman and had plotted reasonably his course of action to achieve his ambition to be the top of that profession. As a stepping stone he accepted his first position with the Keller organization as a dye pot and bottle washer in the dye laboratories. While his stay in the laboratories was short he acquired a working knowledge of the application of dyestuffs. The opportunity to join the office staff was presented to him at 17 and the training prepared him with intimate knowledge of the company's costs and operation. In ten years, at the age of 27, he was made sales manager. At 32 he was made vice president and director. In 1943, he was honored with the presidency of the company.

Mr Zipse's fifty years of service have seen Geigy extend its field of operation to insecticides, pharmaceuticals and auxiliary products while presentation extended to ten offices located to serve the dyestuff-consuming industry in the U S A and Canada. Its insecticide business, starting from the discovery of DDT Insecticides, finds plants operations throughout the U S A.

Geigy's pharmaceutical business, after a laboring start, has taken an important position in the ethical drug field through such products as "Panparnit" (a palliative for Parkinsonism), "Eurax" (a scabicide and antipruritic), "Tromean" (a contribution to anticoagulant therapy), and "Butazolidin" (for various specific forms of arthritis).

Other developments in the Geigy organization, following the acquisition of an important interest in the Cincinnati Chemical Works (Norwood and St Bernard, Ohio) in 1920, have been the purchase of the Alrose Chemical Co at Cranston, Rhode Island and the construction of a modern insecticide plant in McIntosh, Alabama for the synthesis of DDT, benzene hexachloride (BHC) and other active ingredients employed in the field of insecticides.

Mr Zipse's anniversary was celebrated with his personal and business friends and associates. He was singularly honored by the presence of a number of directors from the Geigy operations overseas and by the presence of Dr C E Koechlin of Basle, Switzerland, Mr Zipse's close associate, principal director and head of all Geigy enterprises.

The year 1958 will be the occasion of the 200th Anniverary of the founding of Geigy in Switzerland—the start of this world-wide organization. A fitting celebration is planned to commemorate the occasion.

• Fire Destroys Warehouse of Whippany Firm

The Aquex Development & Sales Corp, Whippany, New Jersey, was the scene of a disastrous fire on the night of August 13th.

A recently completed warehouse was completely destroyed, along with a large stock of finished products and raw materials. There was also extensive damage to the machinery which had been stored in the warehouse.

Preliminary estimates of the damage place the loss between $100,000 and $150,000.

Manufacturing facilities were not impaired by the fire and the company resumed production of its resins on August 18th.

• American Textile Machinery Exposition

Well over 200 firms have contracted for exhibit space at the American Textile Machinery Exhibition to be held in Atlantic City during the week of April 26th-30th, 1954. The exhibition, sponsored by the American Textile Machinery Association, is a quadrennial event, the last being held in 1950. It is anticipated that more than 190,000 square feet of exhibit area will be utilized, the first time in textile history that so much space has been used for such a purpose.

Special "days" will be set aside to feature the textile machinery industry's relation to other groups: "Association Day" will honor the top elected and executive officers of all textile trade associations, as representatives of their segments of the textile industry as a whole; a Forum will feature nationally prominent persons who will discuss important subjects closely identified with the textile industry's prosperity and progress; "Research Day" will bring out research directors of participating companies to answer specific questions and provide requested information at their respective company booths; "Textile Career Day" will be designated in special recognition of textile students.

Visitors to the Exhibition should request hotel reservation blanks, and make their reservations as early as possible through the Convention Housing Bureau, 16 Central Pier, Atlantic City, New Jersey. The hotel reservation blanks may be obtained from the Exhibition Manager, Albert C Rau, Campbell-Fairbanks Associates, 322 Park Square Building, Boston, Mass.

A complete list of exhibitors appears on pages 644 and 645.

• Edwal Changes Name

The Edwal Laboratories, Incorporated became the Ringwood Chemical Corporation on September 1. The name change was voted at a stockholders' meeting on August 11, 1953.

The new corporate title is intended to more accurately describe the present activities of the company, which has grown in 21 years from a two-man laboratory to a major manufacturer of organic chemicals and photographic processing formulations. The same organization and technical staff, under the leadership of W S Guthmann as president will continue.

The name change also marks the complete separation of the Edwal Scientific Products Corporation from Ringwood Chemical Corporation.

According to reports, Ringwood Chemical Corporation has just completed its most successful fiscal year. Earned profits and new investment have permitted the addition in the last two years of five new buildings, process equipment, a modernized packaging line, and additional tank storage facilities for bulk raw materials and anhydrous ammonia.

• Textile Lab Course at NYU

A textile laboratory class will meet at New York University's Washington Square Center from 8 to 9:45 pm on Wednesdays beginning September 23. Registration for the course is being conducted by the NYU School of Retailing, 100 Washington Square East, New York, N Y.

• GAW-GDC Relocate General Purchasing HQ

As of September 8, the general purchasing headquarters of General Aniline Works Division and General Dyestuff Corporation are located at Linden, New Jersey.

• New Type Vicara

A new, process-crimped Vicara, available in either the bleached or unbleached state, is now in commercial production, according to an announcement by Jesse F Yeates, Jr, sales manager of the Fiber Division, Virginia-Carolina Chemical Corporation.

Heretofore, Vicara has been given a mechanical, nonpermanent crimp. The new process is said to impart considerably greater crimp, which, though not 100% permanent, is retained throughout processing and into finished fabrics. It is expected that the new process will greatly facilitate the processing of Vicara in 100% form as well as in blends with other fibers, imparting added loft and bulk to finished fabrics.

The price of the new, process-crimped Vicara is $1.05 per pound unbleached and $1.15 per pound bleached, a premium of 5c per pound over Vicara with conventional crimp. Manufacture of the latter will continue.

• Du Pont Increases Explosive Dept Research Facilities

Research facilities of the Du Pont Company's Explosives Department have been increased substantially with the occupation of a recently completed organic chemistry laboratory building at the Eastern Laboratory, Gibbstown, N J.

This is a continuation of the trend of diversification by which the Explosives Department is expanding into other chemical fields. Purpose of the new laboratory is to develop new organic processes and products. Illustrative of this is one of the department's newest products, dimethyl terephthalate, which is the principal intermediate for Dacron polyester fiber.

The new building at Eastern Laboratory is a two-story structure in which the basic unit is the two-man laboratory. There are twelve of these, similar to those designed for Du Pont research groups for the Experimental Station here and they embody the most modern features of good design, ventilation, and equipment.

Other features of the building include a laboratory for analytical methods development, equipment for research involving infra-red and ultra-violet light, four barricaded cubicles for carrying out high-pressure reactions, an office for the section head and a large conference room. The building houses 25 organic chemists and 15 technicians.

• New Bedford College Plans Further Reorganization

With Massachusetts Governor Herter's recent signing of legislation authorizing the Trustees of the New Bedford Textile Institute to change its name to New Bedford Institute of Textiles and Technology, more advanced reorganiaztion is planned by institute officials.

Timothy J Manning, chairman of the Trustees' Committee on Name Changing, and Representatives Dorman and Saulnier sponsored this legislation which had previously been approved by a majority vote of the institute's Board of Trustees. The change of name provides the opportunity for this contemplated further reorganization.

Present plans call for the possibility of of a Technical Division and a College Division of the Institute of Textiles and Technology. The Technical Division, which would include the evening school, would be included under the same administration and faculty but would involve separate direction and regulation.

Exhibitors at the American Textile Machinery Exhibition

APRIL 26-30, 1954

ATLANTIC CITY, N J

Abbott Machine Co, Inc (winding machinery)
Abington Textile Machinery Works (machinery)
Aetna Felt Co, Inc (cushioning felt)
Allen-Bradley Co (electric control apparatus)
Allen Warper Company (warpers)
Allentown Bobbin Works, Inc (bobbins and spools)
Allis-Chalmers Mfg Co (starters, motors, pumps, drives)
The Louis Allis Co (starters, motors, pumps)
Aluminum Co of America (parts of aluminum and magnesium)
AMERICAN DYESTUF REPORTER (publication)
American Floor Products Co (mats and treads)
America's Textile Reporter (publication)
American Lava Corp (thread guides)
American Moistening Co
The American Monorail Co (material handling equipment)
American Paper Tube Co (yarn carriers)
American Rieter Co, Inc (machinery)
American Viscose Corp (yarns)
Anderson Machine Shop, Inc (Pacific eveness tester, raw steel cutter)
Andrews & Goodrich (drying and ventilating machinery)
Armco Steel Corp (steel)
The Arrow-Hart & Hegeman Electric Co (wiring devices and control apparatus)
Ashworth Bros, Inc (card clothing machine)
Automatic Web Control Mfg Co (guiders)
Bachmann Uxbridge Worsted Corp (slasher)
W H Bagshaw Co, Inc (lags, slats, pins)
The Bahnson Co (humidifying and air conditioning)
Barber-Colman Co (staplers, warpers, tying and drawing)
Barreled Sunlight Paint Co (paint products)
Edward S Beard (spreaders, rings)
Bijur Lubricating Corp (lubricating systems)
Birch Bros (finishing and sewing machinery)
Benjamin Booth Co (card clothing machine)
Briggs-Shaffner Co (beams, quill boards, dryer polls)
The Brush Electronics Co (uniformity and tension analyser)
Bullard Clark Co (loom accessories)
Bunting Brass & Bronze Co (bearings)
Burlington Engineering Co (dyeing equipment)
H W Butterworth & Sons Co (finishing machinery, rayon equipment)
C I T Corporation (industrial financing)
A B Carter, Inc (Boyce weaver's knotters, spinning and twisting travelers)
Cen-Tennial Cotton Gin Co (fiber opener machine)
Century Electric Co (motors and speed drives)
Chapman Electric Neutralizers (electric neutralizer)
The Cleveland Graphite & Bronze Co (bearings, bushings, precision products)
Chemicolloid Laboratories, Inc (homogenizers)
Cleveland Worm & Gear Co (gears)
Clinton Foods (corn starch products)
Cloverland-Freeland Corp (bobbins)
Cocker Machine & Foundry Co (cotton slasher, rayon warper)
Collins Bros Machine Co (machinery)
Container Corp of America (packaging equipment)
Continental Diamond Fibre Co (roving cans, boxes, trucks)
Cook—P & N Machine Co, Inc (finishing equipment)
Cotton Trade Journal (publication)
Courtaulds, Inc (yarns and fabrics)
William Crabb & Co (machine parts)
Crompton & Knowles Loom Works (weaving machinery)
Curlator Corp (machines)
Curtis & Marble Machine Co (shearing machinery and equipment)
Cutler-Hammer, Inc (electric control equipment)
Daffin Mfg Co (humidifiers)
Daily News Record (publication)
Davis & Furber Machine Co (machinery)
Davison Publishing Co (publication)
Diehl Mfg Co (electric motors and industrial sewing machines)
Dixon Lubricating Saddle Co (bobbin holders, top rolls)
Draper Corp (looms)
Duesberg-Bossom of America, Inc (woolen machinery)
E I du Pont de Nemours & Co, Inc (fibers)
Durant Mfg Co (counters and measuring instruments)
Eastern Yarn Mills (yarns)
Edda International Corp (tying-in machinery)
Edgcomb Steel Co (steel and aluminum)
Elastic Stop Nut Corp (rollpin and elastic stop nuts)
Engineered Plastics, Inc (plastics)
Ericcson Telephone Sales Corp (centralograph recording equipment)
Eriez Mfg Co (nonelectric magnetic equipment)
Fafnir Bearing Co (ball bearings and special units)
The Farval Corporation (lubricating systems)
The Felters Co (wool felt pads)
Fibre and Fabric (publication)
Fielden Instrument Division (electronic controls)
Fletcher Works, Inc (winding machinery)
Foster Machine Co (yarn winding machinery)
The Foxboro Co (process instrumentation)
Ernest L Frankl Associates (looms)
Franklin Control Corp (drives)
The Fuller Brush Co (brushes)
Gaston County Dyeing Machine Co (dyeing machinery)
General Electric Co (electrical products)
General Plastics Corp ("Teflon" plastics)
David Gessner Co (finishing machinery)
Ginsberg Machine Co, Inc (trimming and binding machinery)
The Girdler Corp (Votator apparatus)
Glenwood Machinery Associates, Inc (automatic quill polisher)
Graton & Knight Co (leathers)
Grinnel Co, Inc (humidifying and cooking equipment)
Harris Products Co (rubber bushings and auto parts)
Hart-Moisture-Meters (instruments for measuring moisture)
George S Harwood & Son
Hayes Industries, Inc (beams for looms and knitting machines)
Heany Industrial Ceramics (thread guides)
Hermas Machine Co, Inc (machinery)
Herr Mfg Co, Inc (conical rings, flyers)
The John Hewson Co (static control systems, test sets, alarm systems)
Holdsworth Gill Screw Co, Inc (machinery)
R H Hood Co (comb circles and fallers)
Howard Bros Mfg Co (brushes)
Hubbard Spool Co (spools, bobbins, beams)

Hunt Loom and Machine Works, Inc (looms and accessories)
Rodney Hunt Machine Co (dyeing and finishing machinery)
James Hunter Machine Co (dyeing and finishing machinery)
Hyatt Bearings Division (roller bearings)
Industrial Brush Co (brushes)
The Industrial Dryer Corp (conditioners)
Industrial Tape Corp (pressure-sensitive tapes)
The Johnson Corp (steam specialties)
Kearny Mfg Co, Inc (conditioning units)
Walter Kidde & Co, Inc (tension compensators)
Lambeth Rope Corp (rope and canvas products)
The F A Lazenby Co (cop and butt winders)
Lincoln Engineering Co (lubricant equipment)
Link Belt Co (belting)
H F Livermore Corp (loom parts)
Lockwood Greene Engineers, Inc
Lydon Bros (conditioning equipment)
Macbeth Corporation (scientific equipment)
Manton-Gaulin Mfg Co (homogenizers)
The Marquette Metal Products Co (test frames)
Marshall & Williams Corp (machinery)
Mawaco Machine Co (finishing machinery)
Edward J McBride Co, Inc (creel and warp preparation equipment)
McGlynn Hays Industries, Inc (spinning frames)
McKiernan Terry Corp (finishing equipment)
Milton Machine Works, Inc (warp beams and specialties)
The Miller Co (industrial lighting)
Modern Textiles (publication)
Morrison Machine Co (dyeing machinery)
Morse Chain Co (chain drives, couplings, clutches)
Mt Hope Machinery Co (cloth handling devices)
A B Murray Co, Inc (stainless steel)
J M Nash Co (finishing machinery, sanders)
National Drying Machinery Co (drying machinery)
National Ring Traveler Co (spinning-twisting travelers)
National Starch Products, Inc (starches, dextrines, adhesives, resins)
New Departure Division (ball bearings)
New York & New Jersey Lubricating Co (lubricants)
John P Nissen, Jr Co (marking inks)
Norcross Corporation (recording viscometer)
Oakite Products, Inc
Panamerican Publishing Co (publication)
Parks-Cramer Co (climate humidification and traveling cleaner systems)
Penick & Ford, Inc (starches, dextrines, gums)
B F Perkins & Son, Inc (finishing machinery)
Platt Bros (Sales) Ltd (machinery)
Plutte, Koecke & Co (winding machinery)
Pneumafil Corp
William A Popp and Associates (yarns)
Proctor & Schwartz (drying machinery)
Product Sales, Inc (top rolls and spinning items)
The Purnell Co (industrial catalogues)
Robert C Reed Co (lags, slats, pins)
Reeves Pulley Co (variable speed drums and controls)
Robert Reiner, Inc (machinery)
Reliance Electric & Engineering Co (Motors)
Republic Steel Corp (stainless steel)
J E Rhoads & Sons (belting and leathers)
Rice Barton Corp (printing machinery)
Riggs & Lombard, Inc (dyeing and finishing machinery)
B S Roy & Son Co (card grinders)
Rudel Machinery Co, Ltd
S K F Industries (ball and roller bearings, pillow blocks)
Saco-Lowell Shops (machinery)
Sarco Company, Inc (steam specialties, air venting)
C G Sargent's Sons Corp (machinery)
Schmidt Mfg Co (reed cleaning and warp handling machinery)
Scott Testers, Inc (testing equipment)
Scott & Williams, Inc (pulsator pumps)
Seydel-Woolley & Co (chemical specialties)
Shell Oil Co (lubricants)
The Sheffield Corp (tools and precision instruments)
Sill Industries (radiant heating)
Simco Co (static eliminators)
Sipp-Eastwood Corp (machinery)
Sjostrom Machine Co (machinery)
James Smith & Son, Inc (Noble combs and ball winders)
Smith Drum & Co (dyeing and finishing machinery)
Societe Anonyme Adolphus Sauer (looms)
Sonoco Products Co (cones, tubes, spools)
Southern Textile News (publication)
Standard Pressed Steel Co (steel)
Steel Heddle Mfg Co (loom harness, shuttles, supplies)
Stellite American Corp (machinery)
Sterling Engineering Co (stacking boards for handling bobbins, cones, tubes)
Stewart-Warner Corp (lubrication)
Sykes, Inc (steel wire card clothing)
Synthane Corp (bobbins, tubes, chucks)
Taylor Instrument Companies (instruments for wet processing equipment)
G H Tennant Co (floor maintenance machinery)
The Terrell Machine Co (bobbin cleaning machinery)
The Texas Company (lubricants)
Textile Age (publication)
Textile Bulletin (publication)
Textile Industries (publication)
Textile World (publication)
Ton-Tex Corp (belting and mechanical specialties)
Tower Iron Works (warp sizing and wet finishing equipment)
Trumeter Co (counters, measuring and inspecting machines)
Turbo Machine Co (stapler for synthetic fibers)
Twin Disc Clutch Co (clutches and hydraulic drives)
U S Bobbin & Shuttle Co (bobbins and shuttles)
U S Hoffman Machinery Co (centrifugal blowers and exhausters)
U S Textile Machine Co (throwing machinery)
U S Rubber Co (accessories)
Universal Winding Co (winding machinery)
Uster Corp (spinning frames and warping machines)
U S Department of Commerce (National Production Authority)
Van Vlaanderen Machine Co (wet processing machinery)
Veeder-Root, Inc (counting devices)
Venango Engineering Co, Inc (dyeing machinery)
Victor Ring Traveler Co (ring travelers)
Walton Laboratories, Inc (humidification and air-conditioning equipment)
Warner Electric Brake & Clutch Co (motors, brakes, clutches)
The Warner & Swasey Co (machinery)
Watson-Williams Mfg Co (shuttles)
Waukesha Foundry Co (castings)
Werner Machine Co, Inc (dyeing and finishing machinery)
Werner Textile Consultants (management and technical services)
Westinghouse Electric Corp (motors, controls, air cleaners, lamps)
West Point Foundry & Machine Co (slashing machinery)
Whitin Machine Works (machinery)
Wiesner-Rapp Co, Inc (wet-processing machinery)
Winsor & Jerauld Mfg Co (finishing equipment)
Woonsocket Napping Machine Co (napping machinery)

NEW PRODUCTS AND DEVELOPMENTS

• Regent Coning Oil; Spinol RL

Laurel Soap Manufacturing Co, Inc, Philadelphia, has announced two new products, Regent Coning Oil and Spinol RL, specifically developed for application to the new synthetic fibers.

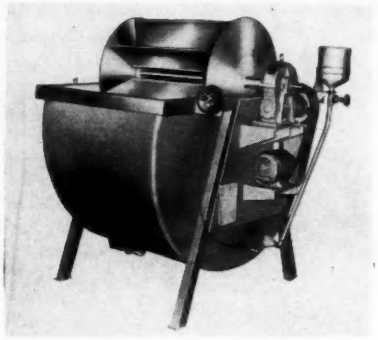
Regent Coning Oil is a self-emulsifying, anionic coning oil incorporating antistatic properties for the treatment of Orlon, Dacron, nylon, Acrilan and acetate. The product is said to improve running and knitting properties and may be applied to filament or spun yarns either as received or as an emulsion from conventional troughs on winders. It is said to contain no mineral oil and reportedly will wash out easily in a regular scour.

Spinol RL is a blended anionic, nonmineral oil compound prepared for use in spinning and knitting where Dacron, Orlon, nylon and acetate fibers and blends are used. It is designed to give lubrication as well as antistatic control. The manufacturer recommends it as a stock lubricant for use prior to spinning and as a yarn lubricant prior to knitting. Spinol RL may be used as received or in a water solution. As a spinning oil, it is applied from spray apparatus and when used as a lubricant, it is applied from a trough on winders. It is said to be easily removed in regular scour and to have no adverse effect in the dyebath or on shades.

• IDL Introduces New Model Colorimeter

Redesigned for greater versatility and lower cost, the new model "C" Color-Eye, manufactured by Instrument Development Laboratories, Needham, Mass, replaces earlier models of this instrument for industrial color measurement and comparison. A comparison colorimeter of high sensitivity and precision, Color-Eye computes logarithmically to simulate the response of eye and brain. Tristimulus-type filters permit measurement under daylight or artificial sources.

The standard instrument is furnished with either diffuse (sphere-type) or 45° normal illumination and viewing, with illuminators interchangeable if desired. Up to 15 filter combinations can be installed in one instrument, it is reported, including narrow-band interference types for abridged spectrophotometry. Transmission and reflectance samples can be accommodated and surface gloss included or excluded. New features include forced cooling, direct reading in terms of X, Y, and Z adjusted values, dual area viewing for large and small sample areas, improved type commutator system, and optical location means for small area.



Klauder Weldon Giles Paddle Wheel Machine without cover.

• K-W-G Paddle Wheel Machine

A new, welded, all-stainless-steel paddle wheel machine, available in a wide range of sizes, has been announced by Klauder Weldon Giles Machine Company, Philadelphia. The new machine, which makes use of very old principle, is said to provide better, more consistent results for sweaters, socks, and other garments, as well as tapes and webbing. It is available with or without cover.

Individual paddles in the paddle wheel are set into milled grooves and welded to provide rigid construction, while splash covers protect motor and drive mechanism. A heavy false bottom prevents danger of damage to goods or machine in the event of overloading.

Full information may be obtained from Klauder Weldon Giles Machine Company, Adams Avenue and Leiper Street, Philadelphia 24, Pa.

• Naftone to Handle New Line Of Fungicide-Bactericides

Charles J Prescott, Jr, president of Bennett Incorporated, Cambridge, Mass, has announced the appointment of Naftone, Inc, New York, as sole selling agent for their new line of fungicide-bactericides, marketed under the trade name of "C 8 Q".

According to H L von Goehde, Bennett's director of research, these odorless compounds are all anionic emulsions of Copper 8-Quinolinolate, available at different concentrations over a wide pH range. They are believed to be the first true emulsions of Copper 8-Quinolinolate produced commercially. Dr von Goehde points out that they have an e m f of zero.

Samples and use information may be obtained by writing to Naftone, Inc, 515 Madison Avenue, New York 22, N Y.

• Armour Marketing Two New Synthetic Detergents

Two new synthetic detergents for textile scouring operations, Energetic and Energetic S, are now being marketed by Armour and Company, Chicago.

Energetic, a nonionic detergent, is reported to have demonstrated characteristics of maximum detergency, high soil-removing and soil-suspending properties, excellent emulsifying action, good wetting properties and surface tension-lowering a ility, and excellent stability to textile chemicals.

Because Energetic is highly concentrated and extremely powerful, quantities required will seldom exceed one-third those of conventional anionic materials, it is claimed.

The product, with wide flexibility for almost all textile scouring operations, is particularly recommended by the manufacturer for kier boiling, hosiery scouring and dyeing, dye leveling, continuous bleaching, soaping-off vat and naphthol dyeings, soaping-off prints and wool scouring.

A companion nonionic detergent, Energetic S, is designed for use in the presence of petroleum and aromatic solvents used to loosen grease, stains and dirt from cloth. Energetic S is said to effectively remove both solvent and dirt from the textile fibers, preventing redeposition of them on the cloth.

Armour suggests that extensive use of Energetic S can be made in cotton desizing operations, boiling-off such synthetic fibers as Dacron and Orlon, hosiery finishing, and as a machinery cleaner.

Both products are available in 5 and 55-gallon steel drums.

A booklet outlining details on chemical and physical properties and uses, as well as information on samples, trial orders and technical counsel, is available from Armour and Company, Industrial Soap Department, 1355 West 31st Street, Chicago 9, Illinois.

• First Commercial Shipment Of Canadian-Made Pentaerythritol

The first commercial shipment of Canadian-made pentaerythritol went out August 17th in tonnage quantities from the Varennes, Quebec plant of St Maurice Chemicals Ltd, jointly owned by Heyden Chemical Corporation and Shawinigan Chemicals, Ltd, subsidiary of Shawinigan Water and Power Company.

The new St Maurice plant reportedly has capacity for 30 million pounds of formaldehyde and 3 million pounds of pentaerythritol.

• Commercial Spinning of Colored Dynel Begun

Carl A Setterstrom, general manager of the Textile Fibers Department, Union Carbide and Carbon Corporation, has announced that the commercial spinning of colored dynel fiber has begun. The first pilot plant production of dynel containing a built-in antistatic agent, an increase in the production capacity for dynel staple and the discontinuance of manufacture of Vinyon N continuous filament yarns, have also been made known by the company.

The new colored fiber is manufactured by adding pigments to a solution of the dynel resin prior to spinning, affording durable colors without changing the other properties of the fiber. Priced at $1.50 per pound for tow and staple, the resin-dyed fiber will first appear at retail this fall in, among other things, dynel-wool men's suitings. Other immediate uses include deep-pile fabrics for collar trim, doll wigs, and automotive fabrics.

The resin-dyed fiber is made possible by a new manufacturing process that reportedly permits flexibility of operation, good color reproducibility, rapid color matching, and quick and complete clean-up of equipment. This process is said to overcome the chief disadvantage of resin-dyeing———the need for large inventories of dyed resin and fiber.

For some uses, particularly dark shades of high light fastness, the colored dynel should have marked economic advantages. However, for many uses of dynel——— particularly apparel blends that are piece dyed———it is expected that the trade will continue to prefer the undyed fiber and to dye by conventional methods. Carbide's laboratories will continue to provide technical assistance for stock, package, and piece dyeing.

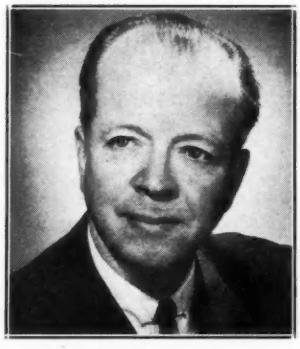
An important offshoot of the resin dyeing project has been the development of a whiter dynel fiber by the addition of white pigments for use in underwear, children's hose and sweaters. The price of the whiter dynel will be $1.30 a pound.

By adding to the dynel resin a complex chemical compound Carbide has sharply reduced the development of static electricity in the fiber. Initial pilot-plant shipments of the fiber manufactured by the process have been made. Although this antistatic additive is a chemical cousin of the dynel resin, it changes the dye affinity and other properties of the fiber somewhat. For this reason the development program is proceeding cautiously, and none of this new fiber will be available in goods at the retail level for at least twelve months. Testing programs, however, are being initiated on the antistatic dynel for men's socks and work clothes as well as for blankets.

Carbide has found it necessary to increase the production capacity for dynel staple fiber at South Charleston, W Va, from four million to five million pounds a year, and discontinuance of production of Vinyon N continuous filament yarns will be necessary to provide room in existing buildings in order to achieve the increased production of dynel this year. It is expected that the changeover will be completed in about three months.

NAMES IN THE NEWS

J H Babcock



J H Bruun

J H BABCOCK, formerly vice president in charge of development and research, has been named vice president of Hooker Electrochemical Company and J H BRUUN, formerly director of research, has been appointed director of research and development.

In his new position Mr Babcock, who has been with Hooker since 1916, will have greater responsibilities with respect to overall management of the company. He will continue as a member of the research committee of the company and will also continue in charge of the General Developments Division. In addition, licensing activities and the patent section will remain in his charge.

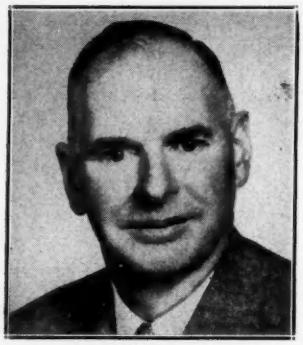
Dr Bruun joined Hooker in December of 1952 as director of research. He will now be in complete charge of all research and new product development activities. He has had previous service with General Aniline and Film Corporation, Sun Oil Company, the National Bureau of Standards and American Aniline Products, Inc.

EDWARD S PIERCE has been appointed to the new post of general manager of H W Butterworth & Sons Co, Bethayres, Pa.

Mr Pierce will be in charge of engineering, manufacturing, research and development, purchasing and personnel. Former Butterworth works manager, he will be succeeded by GEORGE BROMLEY. Mr Bromley was formerly shop superintendent.

G S J WHITE, chief colorist of the Dyestuffs Division of Imperial Chemical Industries Ltd, was appointed Division director in charge of Technical Service Departments on August 1. He succeeds F J SIDDLE, who has taken the post of managing director of the Terylene Council.

Mr White joined ICI's Dyestuff Division 24 years ago. He is currently a member of the Council and Chairman of the Lancashire Section of the Society of Dyers and Colourists, and a fellow of the Textile Institute.



J F Fitzgerald

J F FITZGERALD has been elected an assistant vice-president of National Starch Products Inc, New York.

Mr Fitzgerald has been associated with the company for the past 18 years, and has been closely identified with the company's starch sales to the textile, paper and food fields. He has been manager of starch sales since 1948.

ALEX ROSE, manager of the Rock Hill, S C, acetate yarn plant of Celanese Corporation of America, has been elevated to the new position of director of engineering of the Textile Division of the company. JOHN P LOUD, who has been special assistant to the plant manager of the Cumberland, Md, plant, was named to succeed Mr Rose as plant manager of the Rock Hill unit.

Elsewhere in the Celanese organization, ROBERT J DAVIS and SIDNEY B SMITH have joined the Product Development Department of the Chemical Division. Mr Davis, formerly associated with Colgate - Palmolive - Peet Company, will handle sales development of vinyl acetate. Mr Smith, previously with Westvaco Chemical Division, will engage in market research work.

EDWARD SWANEZY, who has joined the Chemical Division as a sales representative, has been assigned to the New York office. HARRY BARTLEY, previously attached to the New York office, has been assigned to the Mid-Atlantic District.

MARGUERITE P KEARNS, senior technician of the research laboratory at J C Penney Company, New York, will be the instructor for a textile laboratory course to be given in the fall term by New York University's School of Retailing.

Miss Kearns has been with J C Penney since 1949. She was formerly a fabric analyst for the Burlington Mills Corporation and a research chemist for the United Piece Dye Works. Currently, Miss Kearns is member of AATCC's Technical Committee on Research.

JB GOLDBERG, consultant to the textile and allied industries, and former research director of J P Stevens & Co, Inc, has been appointed technical adviser to the Rayon Information Center.

THE Greensboro, N C, office of Catalin Corporation of America has announced the placing of JACK SERTAIN in Atlanta, Ga. Mr Sertain will serve as technical representative to the wood products, textile, and foundry industries in that area.

T MORTON CURRY is now associated with Esmond Chemical Company, Esmond, R I, as vice president and sales manager. Mr Curry has been prominent in the Rhode Island textile trade for over 30 years.

NEWLY appointed as director of public relations for the National Institute of Drycleaning is WILLIAM L BROWNE, formerly production manager of radio station WMAL, Washington, D C. A former newspaper writer and editor as well as a radio and television executive, Mr Browne has a broad background in the general field of public relations and the media.

THE promotion of JAMES E DEAS, JR, to the position of assistant chief chemist in charge of the Technical Service Group at the Covington plant of Industrial Rayon Corporation has been announced. Mr Deas was previously attached to the production superintendent's staff.

RAY C TOWER has returned to Westvaco Chemical Division, Food Machinery & Chemical Corporation, New York, after a two-year tour of active duty with the U S Navy and has been named assistant divisional manager, phosphate sales, with headquarters at New York.

In his new position, Mr Tower succeeds JOHN PETERSON, who has been appointed district sales manager at Chicago. Mr Peterson was advanced to the position of assistant divisional sales manager at New York in August 1951 after serving for two years as a sales representative in the Intermountain territory with headquarters at Pocatello, Idaho.

The resignation of W NEWELL WYATT as district sales manager at Chicago became effective August 7.

MELVIN N TURETZKY has joined the Process Development staff of the Grasselli plant of General Aniline & Film Corporation.

H J Noebels

HENRY J NOEBELS has been named head of the Applications Engineering Division of Beckman Instruments. Inc, South Pasadena, Calif.

Mr Noebels has been associated for the past eight years with the Heyden Chemical Company, Garfield, N J, in charge of the physical instrumental analytical research laboratory. He worked also during this period as adjunct-professor of analytical instrumentation at Newark College of Engineering.

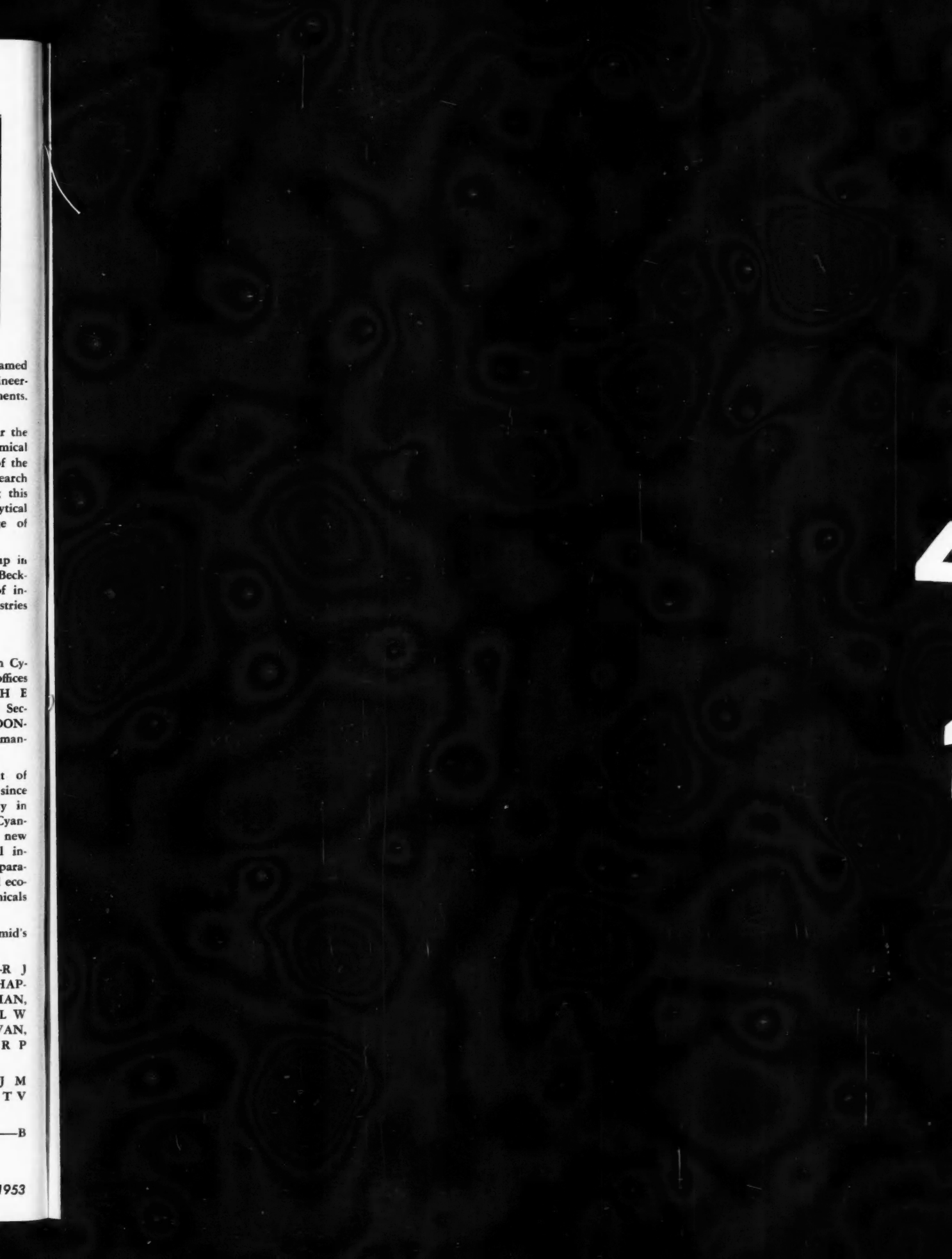
The appointment follows a step-up in applications engineering activities at Beckman, keyed to broad field studies of instrumentation for the process industries and industrial research laboratories.

PERSONNEL news from American Cyanamid Company's New York offices reveals the appointment of RALPH E BURGESS as head of the Economic Section, Budget Department and W R DONALDSON as assistant to the general manager, Industrial Chemicals Division.

Mr Burgess had been president of Commodity Marketing Corporation since 1946. Mr Donaldson was formerly in charge of the Economic Section of Cyanamid's Budget Department. In his new post, Mr Donaldson's activities will include cost analysis and control, preparation of budgets, market planning and economic analysis for the Industrial Chemicals Division.

College graduates added to Cyanamid's staff during the summer include:

Industrial Chemicals Division——R J ALTIER, R O AUCOIN, H H CHAPPELL, H C GAFFNEY, R P HUCKMAN, G G JONES, P J FITZPATRICK, L W KEPLER, R H MUNSTER, J J ROWAN, R T SCHOEPFLIN, C W SLADE, R P WHITE, and W S WOLF.

Plastics and Resins Division——J M LOSITO, J E LYNCH, R R MIRON, T V SULLIVAN, and D J TORRES.

Agricultural Chemicals Division——B L WINGERT.